OPERATOR MANUAL

AMSCO® C Series Small Steam Sterilizers
16 x 16" (406 x 406mm)
20 x 20" (508 x 508 mm)

• Prevacuum • Steam Flush Pressure Pulse

(05/07/12) **P129394-176**

A WORD FROM STERIS CORPORATION

This manual contains important information on proper use of this sterilizer. **All operators and department heads must carefully review and become familiar with the warnings, cautions and instructions contained in this manual.** These instructions are important to the health and safety of personnel operating the sterilizer and should be retained in a conveniently accessible area for quick reference.

This sterilizer is specifically designed to process goods using only the cycles as specified in this manual. If there is any doubt about a specific material or product, contact the manufacturer of the product for the recommended sterilization technique.

STERIS Corporation carries a complete line of accessories for this unit to simplify, organize and assure the conditions for sterilization have been achieved. Instrument trays, pouches and biological/ chemical monitoring systems are all available to fulfill your facility's processing needs. STERIS® will gladly review these with you.

Service Information

A thorough preventive maintenance program is essential to safe and proper sterilizer operation. You are encouraged to contact STERIS concerning our Preventive Maintenance Agreement. Under terms of this agreement, preventive maintenance, adjustments and replacement of worn parts are done on a scheduled basis to assure equipment performance at peak capability and help avoid untimely or costly interruptions. STERIS maintains a worldwide staff of well-equipped, factory-trained technicians to provide this service, as well as expert repair services. Contact your STERIS representative for details.

Indications for Use

The AMSCO® C Series Small Steam Sterilizer is designed for sterilization of heat- and moisture-stable materials used in healthcare facilities and is available in two models:

- **Prevacuum** – designed for sterilization of heat- and moisture-stable materials. The Prevacuum sterilizer is equipped with Prevacuum, Gravity, Liquid, Leak Test and Dart (Bowie-Dick) cycles.
- **Steam Flush Pressure Pulse (SFPP)** – designed for sterilization of heat and moisture-stable materials. The SFPP sterilizer is equipped with SFPP, Prevacuum, Gravity, Liquid, Leak Test and Dart (Bowie-Dick) cycles.

Important: The liquid cycle is for non-patient contact use only.

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(Continued on following page.)

Factory-Set Cycles and Cycle Values[1]

The AMSCO C Series 16C and 20C **Prevacuum** Small Steam Sterilizer 16 x 16" (406 x 406 mm) and 20 x 20" (508 x 508 mm) is equipped with the following factory programmed sterilization cycles and cycle values (**Table 1**).

NOTE: *Default cycles for SFPP sterilizer shown in Table 1B on following page.*

Table 1. Factory Default Cycles, Prevacuum Configuration

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load*	Validation Standard
1. Immediate Use Prevac Cycle	270°F (132°C)	4 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, porous and non-porous loads. Maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
2. Prevac Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays containing multiple instruments, porous and non-porous loads. Maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
3. Prevac Cycle	275°F (135°C)	3 Minutes	30 Minutes	Double-wrapped instrument trays containing multiple instruments, porous and non-porous loads. Maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
4. Prevac Cycle	270°F (132°C)	4 Minutes	20 Minutes**	Fabric Packs.	ST-8:2008
5. Immediate Use Gravity Cycle	270°F (132°C)	10 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, non-porous load. Maximum weight per tray: 25 lb (11.3 kg).	ST-8:2008
6. Immediate Use Gravity Cycle	270°F (132°C)	3 Minutes	1 Minute		ST-8:2008

* *See **Table 4** for recommended quantities.*

** *Dry time can be reduced to 5 minutes for a single fabric pack.*

1. *Supervisor must enable access to optional cycles, such as the Liquids Cycle.*

The AMSCO C Series 16CS and 20CS **Steam Flush Pressure Pulse** (SFPP) Small Steam Sterilizer 16" x 16" (406 x 406 mm) and 20" x 20" (508 x 508 mm) is equipped with the following factory programmed sterilization cycles and cycle values (**Table 2**).

Table 2. Factory Default Cycles, SFPP Configuration

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load*	Validation Standard
1. SFPP Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays containing multiple instruments, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
2. SFPP Cycle	275°F (135°C)	3 Minutes	30 Minutes**		ST-8:2008
3. SFPP Cycle	270°F (132°C)	4 Minutes	20 Minutes	Fabric Packs.	ST-8:2008
4. Immediate Use Gravity Cycle	270°F (132°C)	10 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, non-porous load. Maximum weight per tray, 25 lb (11.3 kg).	ST-8:2008
5. Immediate Use Gravity Cycle	270°F (132°C)	3 Minutes	1 Minute		ST-8:2008

* *See **Table 4** for recommended quantities.*
** *Dry time can be reduced to 5 minutes for a single fabric pack.*

Table 3. Test Cycles

Test Cycles for All Units:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load	Validation Standard
6. Leak Test*	N/A	N/A	N/A	None	ST-8:2008
7. Dart Test*	270°F (132°C)	3-1/2 Minutes	1 Minute	Dart or Bowie-Dick Test Pack	ST-8:2008
8. Dart Warm-up*	270°F (132°C)	3 Minutes	1 Minute	None	N/A

* *Not adjustable.*

Table 4. Maximum Loads by Sterilizer Chamber Size[1]

Chamber Size	Wrapped Instrument Trays	Fabric Packs
16 x 16 x 26" (406 x 406 x 660 mm)	2	4
20 x 20 x 38" (508 x 508 x 965 mm)	3	6

[1] *Refer to **Table 1** and **Table 2** to determine cycle use guidelines.*

Table 5. Liquid Cycle Processing Guidelines

Sterilizer Size	Number of Containers for Liquid Cycle* Full Load	Volume of Liquid in One Container	Minimum Recommended Sterilize Time at 250°F (121°C) in Minutes
16 x 16 x 26" (406 x 406 x 660 mm)	15	1000 mL	45
20 x 20 x 38" (508 x 508 x 965 mm) with Loading Car	32		
20x 20 x 38" (508 x 508 x 965 mm) with Rack and Shelves	28		

* *The liquid cycle is for non-patient contact use only.*

Table 6. Sterilizer Configurations

AMSCO C Small Steam Sterilizers are offered in the following configurations:

16" Configurations	
16 x 16 x 26" (406 x 406 x 660 mm)	Single Door, Prevacuum
16 x 16 x 26" (406 x 406 x 660 mm)	Single Door, SFPP
16 x 16 x 26" (406 x 406 x 660 mm)	Double Door, Prevacuum
16 x 16 x 26" (406 x 406 x 660 mm)	Double Door, SFPP
20" Configurations	
20 x 20 x 38" (508 x 508 x 965 mm)	Single Door, Prevacuum
20 x 20 x 38" (508 x 508 x 965 mm)	Single Door, SFPP
20 x 20 x 38" (508 x 508 x 965 mm)	Double Door, Prevacuum
20 x 20 x 38" (508 x 508 x 965 mm)	Double Door, SFPP

Advisory

This sterilizer is specifically designed to only process goods using the cycles as specified in this manual. If there is any doubt about a specific material or product, contact the manufacturer of that product for the recommended sterilization technique.

A summary of the safety precautions to be observed when operating and servicing this equipment can be found in *SECTION 1* of this manual. Do not operate or service the equipment until you have become familiar with this information.

Any alteration of the sterilizer not authorized or performed by STERIS will void the warranty. Alteration of the equipment which could adversely affect its operation and sterilization efficacy may violate national, state and local laws or regulations.

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TABLE OF CONTENTS

Section Number	Description	Page
1	**Safety Precautions**	**1-1**
2	**Symbol Definitions**	**2-1**
3	**Installation Verification**	**3-1**
3.1	Installation Checklist	3-1
3.1.1	Service Clearance	3-1
3.1.2	Plumbing Services	3-1
3.1.3	Electrical Service	3-2
3.1.4	Sterilizer Final Check	3-2
3.1.5	Cycle Operation	3-2
3.2	Technical Specifications	3-3
3.2.1	Overall Size	3-3
3.2.2	Weight (Fully Loaded)	3-3
3.2.3	Utility Requirements	3-3
3.2.4	Environmental Conditions	3-3
4	**Techniques of Sterilization**	**4-1**
4.1	General	4-1
4.2	Immediate Use	4-4
4.3	Control Measures for Verifying Sterilization Process	4-4
4.3.1	Biological Monitors	4-5
4.3.2	Testing for Prevacuum Efficiency	4-5
4.4	Dart (Bowie-Dick) Test	4-5
4.5	Vacuum Leak Test	4-6
4.6	Recommendations for the Sterilization Process	4-6
4.7	Techniques of Sterilization for Liquid Cycle	4-7
4.8	Recommendations for Sterilizing Liquids	4-8
4.9	Sterilization of Implantable Devices	4-8
5	**Component Identification**	**5-1**
5.1	General	5-2
5.2	Main Sterilizer and Cycle Controls	5-2
5.3	Control Displays	5-4
5.4	Alarm Displays	5-5
5.5	Operating End Control Panel	5-6
5.6	Cycle Selection Touch-screen Pads	5-8
5.6.1	Values Touch-Screen Pads	5-9
5.6.2	Abort Touch-Screen Pad	5-10
5.7	Printer	5-11
5.8	Printouts	5-12

TABLE OF CONTENTS

Section Number	Description	Page
5.9	Power-Door Operation	5-14
5.10	Emergency Door Opening Procedure	5-15
5.11	Emergency Stop Switch	5-16
5.11.1	Emergency Stop Key	5-17
5.11.2	Emergency Stop Guard	5-17
5.11.3	Emergency Stop Label	5-17
5.12	Optional Electric Steam Generator	5-18
6.1	Before Operating the Sterilizer	6-1
6	**Sterilizer Operation**	**6-1**
6.2	Preparing Loads for Sterilization Cycles	6-3
6.3	Guidelines for Placement of Various Loads	6-3
6.4	Unloading the Sterilizer	6-4
6.5	Loading Car Instructions: Loading	6-5
6.6	Loading Car Instructions: Unloading	6-6
6.7	Loading/Unloading Sterilizer: Rack and Shelves	6-6
6.8	Prevacuum Sterilizer Cycles	6-7
6.9	Prevac Cycles	6-9
6.10	Gravity Cycles	6-13
6.11	Liquid Cycle	6-17
6.12	SFPP Sterilizer Cycles	6-19
6.13	SFPP Cycles	6-21
6.14	Test Cycles	6-24
6.14.1	Dart (Bowie-Dick) Test	6-25
6.14.2	Vacuum Leak Test	6-28
6.15	Aborting Cycles	6-30
6.16	Cycle Graphs	6-31
7	**Cycle and Control Value Programming**	**7-1**
7.1	Change Values	7-1
7.2	Change Cycle Values	7-2
7.2.1	Overview	7-2
7.2.2	Adjusting Cycle Sterilize Time and Dry Time	7-2
7.2.3	Step by Step Flowchart	7-4
7.3	Entering Custom Cycle Names	7-7
7.4	Change Time and Date	7-8
7.5	Change Machine Setup	7-11
7.5.1	Access Code	7-12
7.5.2	Lockout	7-14
7.5.3	Utilities Control	7-16
7.5.4	Steam Generator Flush and Drain Set Up	7-20

TABLE OF CONTENTS

Section Number	Description	Page
7.5.5	Steam Generator Flush Cycle	7-21
7.5.6	Language	7-22
7.5.7	Machine Number	7-23
7.5.8	Time Format	7-23
7.5.9	Print Format	7-24
7.5.10	Audible Signals	7-27
7.5.11	Units	7-28
7.5.12	Date Format	7-28
7.5.13	Duplicate Print	7-29
7.6	Leaving Change Values	7-30
8	**Routine Maintenance**	**8-1**
8.1	Preventive Maintenance Schedule	8-1
8.2	Daily Maintenance Procedures	8-3
8.2.1	Check Printer Paper Supply	8-3
8.2.2	Clean Chamber Drain Strainer	8-3
8.3	Weekly Maintenance Procedure: Flush Chamber Drain	8-4
8.4	Chamber Cleaning	8-5
8.5	Printer Maintenance	8-7
8.5.1	Change Printer Paper Roll	8-7
8.5.2	Change Printer Ink Cartridge	8-12
9	**Troubleshooting**	**9-1**
9.1	General	9-1
9.1.1	Typical Alarm Screen	9-1
9.1.2	Typical Alarm Printout	9-2
9.2	In-Cycle Alarms	9-2
9.2.1	Too Long In Charge	9-2
9.2.2	Too Long In Exhaust	9-3
9.2.3	Too Long In Evacuation	9-3
9.2.4	Too Long In Air Break	9-4
9.2.5	Under Sterilize Temperature	9-5
9.2.6	Over Sterilize Temperature	9-6
9.2.7	Door Unsealed	9-7
9.2.8	Chamber Pressure/Temperature Failure	9-7
9.2.9	Exhaust Rate Too Fast	9-8
9.2.10	Exhaust Rate Too Slow	9-9
9.2.11	Recorder Deviation Alarm	9-9
9.2.12	Generator Drain Temperature Probe Failure Alarm	9-10
9.3	Out-of-Cycle Alarms	9-11

TABLE OF CONTENTS

Section Number	Description	Page
9.3.1	Too Long To Close Door	9-11
9.3.2	Too Long To Open Door	9-12
9.3.3	Pressure In Chamber	9-13
9.3.4	Waste Temperature Probe Failure	9-13
9.3.5	Atmospheric Pressure Alarm	9-14
9.3.6	Input/Output Board #1 Communication Failure	9-15
9.3.7	ROM Failure	9-16
9.3.8	RAM Failure	9-16
9.3.9	ADC Failure	9-16
9.3.10	Emergency Stop Switch Pressed	9-17
9.4	Sensor Alarms	9-18
9.4.1	Water In Chamber	9-18
9.4.2	Too Long In Jacket Charge	9-19
9.4.3	Too Long To Seal Door	9-19
9.4.4	Too Long To Unseal Door	9-20
9.4.5	Chamber Pressure Transducer Failure	9-21
9.4.6	Chamber Temperature Probe Failure	9-21
9.4.7	Jacket Temperature Probe Failure	9-22
9.4.8	Door Switch Failure	9-23
9.4.9	Door Seal A Switch Malfunction	9-24
9.4.10	Board Overtemp Failure	9-24
10	**Service Procedures**	**10-1**
10.1	General	10-1
10.2	Air Filter Replacement	10-1
10.3	Clean Strainers	10-3
10.4	Door Seal Replacement Procedure	10-4
10.5	Steam Trap Replacement	10-5
10.6	Clean or Replace Piping Check Valves	10-5
10.7	Rebuild Solenoid Valves	10-6
10.8	Safety Valve Test	10-6
10.9	Recommended Spare Parts	10-7
10.10	Waste Products Disposal	10-10

LIST OF FIGURES

Descrption **Page**

Figure 4-1. Vented Closures 4-8
Figure 5-1. AMSCO C Series Small Steam Sterilizer Control Components 5-1
Figure 5-2. Basic Controls 5-3
Figure 5-3. Typical Out-Of-Cycle and In-Cycle Displays 5-4
Figure 5-4. Alarm Display Examples 5-5
Figure 5-5. Control Panel 5-7
Figure 5-6. Cycle Selection Touchpads 5-8
Figure 5-7. Values Touch-Screen Pads 5-9
Figure 5-8. Cycle Abort Touch-Screen Pad 5-10
Figure 5-9. Typical Printout 5-13
Figure 5-10. Power Door Floor Pedal 5-14
Figure 5-11. Emergency Door Opening Procedure 5-15
Figure 5-12. Emergency Stop Switch, Key and Guard 5-16
Figure 5-13. Press Abort Button to End Cycles When Needed 5-16
Figure 5-14. Emergency Stop Label 5-17
Figure 6-1. Utility Supply Valves and Basic Sterilizer Controls 6-2
Figure 6-2. Align Loading Car with Chamber Opening 6-5
Figure 6-3. Sterilizer Chamber Equipped with Rack and Shelves 6-7
Figure 6-4. Prevac Cycle In-Cycle Screens 6-8
Figure 6-5. Typical Prevacuum Cycle Printouts 6-10
Figure 6-6. Gravity Cycle In-Cycle Screens 6-12
Figure 6-7. Typical Gravity Cycle Printout 6-14
Figure 6-8. Liquid Cycle In-Cycle Screens 6-16
Figure 6-9. Typical Printout of a Liquid Cycle 6-18
Figure 6-10. SFPP Cycle In-Cycle Screens 6-20
Figure 6-11. Typical Printouts – 270°F SFPP and 275° SFPP Cycles 6-22
Figure 6-12. Test Cycles Start-Cycle Screens 6-24
Figure 6-13. Dart (Bowie-Dick) Test Cycle Printout 6-27
Figure 6-14. Typical Printout of a Leak Test Cycle 6-29
Figure 6-15. Cycle Graph – 270°F or 275°F Prevacuum and Dart (Bowie-Dick) Cycles 6-31
Figure 6-16. Cycle Graph – Gravity Cycle 6-31
Figure 6-17. Cycle Graph – Leak Test 6-32
Figure 6-18. Cycle Graph – Steam Flush Pressure Pulse (SFPP) Cycles 6-32
Figure 6-19. Cycle Graph – Liquid Cycle 6-33
Figure 7-1. Accessing Change Cycle Values, Part 1 of 3 7-4
Figure 7-2. Change Cycle Values Procedure, Part 2 of 3 7-5
Figure 7-3. Change Cycle Values Procedure, Part 3 of 3 7-6
Figure 7-4. Enter or Change Custom Cycle Names 7-7
Figure 7-5. Generator Flush Duration Time Control Screen 7-21

LIST OF FIGURES

Description **Page**

Figure 7-6. Sample Full and Condensed Printouts 7-26
Figure 8-1. Remove Chamber Drain Strainer 8-3
Figure 8-2. Tear Paper in Printer 8-7
Figure 8-3. Remove Take Up Spool 8-7
Figure 8-4. Remove Paper From Spool 8-8
Figure 8-5. Remove Remaining Previous Paper 8-8
Figure 8-6. Insert New Paper Roll 8-9
Figure 8-7. Insert Paper Through Printer Slot 8-9
Figure 8-8. Press Paper Feed Touch Screen Button 8-10
Figure 8-9. Insert Paper Into Take Up Spool 8-11
Figure 8-10. Rotate to Secure Paper on Spool 8-11
Figure 8-11. Reinstall Take Up Spool 8-12
Figure 8-12. Tear Paper 8-12
Figure 8-13. Press On End of Cartridge 8-13
Figure 8-14. Remove Cartridge 8-13
Figure 8-15. Press New Cartridge Into Place 8-14
Figure 8-16. Tighten Cartridge Ribbon 8-14
Figure 9-1. Typical Alarm Screen 9-1
Figure 9-2. Typical Alarm Printout 9-2
Figure 10-1. Serviceable Components 10-2
Figure 10-2. Remove Door Seal 10-3
Figure 10-3. Location of Seal Lot Data and Reference indicators 10-3
Figure 10-4. Steam Trap 10-5
Figure 10-5. Internal Pilot-Operated Solenoid Valve. 10-6
Figure 10-1. Piping Schematic 10-9

LIST OF TABLES

Table 1. Factory Default Cycles, Prevacuum Configuration ii
Table 2. Factory Default Cycles, SFPP Configuration iii
Table 3. Test Cycles iii
Table 4. Maximum Loads by Sterilizer Chamber Size 1 iii
Table 5. Liquid Cycle Processing Guidelines iv
Table 6. Sterilizer Configurations iv
Table 2-1. Symbol Definitions 2-1
Table 4-1. AMSCO C Series Prevacuum Sterilizer Cycles 4-1
Table 4-2. AMSCO C Series SFPP Sterilizer Cycles 4-3
Table 4-3. Liquid Cycle Processing Guidelines 4-7
Table 6-1. Factory-Set Prevacuum Cycles and Cycle Values 6-8
Table 6-2. Factory-Set Gravity Cycles and Cycle Values 6-12
Table 6-3. Factory-Set Optional Liquid Cycle and Cycle Values 6-16
Table 6-4. Factory-Set *SFPP* Sterilizer Cycles and Cycle Values 6-20
Table 6-5. Test Cycles 6-24
Table 7-1. Adjustment Ranges for Cycle Values 7-3
Table 7-2. Change Machine Setup 7-11
Table 7-3. Required Feed Water Quality for Carbon Steel Steam Generators 7-20
Table 8-1. Preventive Maintenance 8-1
Table 10-1. Replacement Parts AMSCO C Series Small Steam Sterilizer 16 x 16" (406 x 406 mm) and 20 x 20” (508 x 508 mm) 10-8

SAFETY PRECAUTIONS

1

The following *Safety Precautions* must be observed when operating or servicing this AMSCO® C Series Steam Sterilizer. WARNING indicates the potential for personal injury and CAUTION indicates the potential for damage to equipment. For emphasis, certain *Safety Precautions* are repeated throughout the manual. It is important to review **all** *Safety Precautions* before operating or servicing the unit.

Strictly following these *Safety Precautions* enhances the Customer's ability to safely and effectively utilize the unit and helps avoid improper maintenance methods which may damage the unit or render it unsafe. It is important to understand that these *Safety Precautions* are not exhaustive; Customers are encouraged to develop their own safety policies and procedures to enhance and complement these *Safety Precautions.*

WARNING – ELECTRIC SHOCK AND BURN HAZARD:

Disconnect all utilities to sterilizer before servicing. Do not service the sterilizer unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.

WARNING – PERSONAL INJURY HAZARD:

Avoid personal injury from bursting bottles. Liquid sterilization cycle must only be used for liquids in borosilicate (Pyrex®[a]) flasks with vented closures.

a. PYREX® is a registered trademark of Corning Incorporated.

WARNING:

The liquid cycle is for non-patient contact use only.

WARNING – BURN HAZARD:

When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:

- Use Liquid cycle only; no other cycle is safe for processing liquids.
- Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.
- Use only Type I borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.
- Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.

Do not attempt to open the sterilizer door if a **WATER IN CHAMBER ALARM** condition exists. Call a qualified service technician before attempting to use sterilizer further.

After manual exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.

WARNING – BURN HAZARD: (CONTINUED)

Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.

Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.

Jacket pressure must be 0 psig before beginning work on the steam trap.

Proper testing of the safety valve requires the valve to be operated under pressure. Exhaust from the safety valve is hot and can cause burns. Proper safety attire (gloves, eye protection, insulated overall) as designated by OSHA, is required. Testing is to be performed by qualified service personnel only.

Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.

WARNING – EXPLOSION HAZARD:

This sterilizer is not designed to process flammable compounds.

WARNING – SLIPPING HAZARD:

To prevent falls, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

WARNING – PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE HAZARD:

Regularly scheduled preventive maintenance is required for safe and reliable operation of this equipment. Contact your STERIS service representative to schedule preventive maintenance.

When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury, result in costly equipment damage and/or void the warranty.

The performance of the 510k cleared AMSCO C Series Sterilizer is validated as a system including components defined by STERIS in the Operator Manual and Service Manual for the AMSCO C Series Sterilizer. Substitution of unauthorized components can potentially lead to personal injury, damage or premature failure of the product and result in a unit configuration that is inconsistent with the validated, FDA cleared product. Altering the equipment or using unapproved component's may void STERIS' warranty. DO NOT USE components that are not validated as part of the AMSCO C Series Sterilizer.

WARNING – STERILITY ASSURANCE HAZARD:

Load sterility may be compromised if the biological indicator or air leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

WARNING – STERILITY ASSURANCE HAZARD: (CONTINUED)

According to AAMI standards, a measured leak rate greater than 1 mm Hg/minute (1.3 mbar/min) indicates a problem with the sterilizer. Refer the situation to a qualified service technician before using the sterilizer further.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

Gasket must be fully retracted prior to operating sterilizer door.

If 0 dry time is selected, sterilizer automatically initiates a vapor removal phase in place of drying. This phase can still draw a vacuum to 5 inHg. Consult device manufacturer's recommendations to ensure devices being processed can withstand this depth of vacuum.

Lifting the chamber float switch when cleaning the chamber may cause the sterilizer control to initiate a "Chamber Flooded" alarm. If this alarm condition occurs, the operator must turn the control power OFF then ON to clear the alarm. The control power switch is located in the mechanical area at the side of the sterilizer. Placing the sterilizer in standby does not clear this alarm.

Never use a wire brush, abrasives or steel wool on door and chamber assembly. Do not use cleaners containing chloride on stainless-steel surfaces. Chloride-based cleaners will deteriorate stainless steel, eventually leading to failure of the vessel.

Do not use cleaners containing chlorides on loading cars. Chloride-based cleaners will deteriorate the loading car metal.

Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.

Allow thermostatic traps to cool down to room temperature before removing cover. Since there is nothing to limit expansion, the bellows may rupture or fatigue if trap is opened while hot.

Actuation at less than 75% of rated pressure can allow debris to contaminate the seat and cause the safety valve to leak. A leaking safety valve must be replaced.

Insufficient service clearance will make repairs more difficult and time-consuming.

Piping sized too small may cause water hammer, resulting in damage to the sterilizer.

After installation, it is mandatory to brace piping at the drain funnel so that it will not move vertically.

Make sure door opening is clear of any obstruction before closing the door(s).

Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig.

During manual operation, gasket must be fully retracted prior to operating sterilizer door.

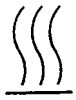
Immediately wipe up saline solution spills on loading car to prevent damage to stainless steel.

SYMBOL DEFINITIONS

2

The following symbols appear on AMSCO® C Series Small Steam Sterilizers and are provided here for reference.

Table 2-1. Symbol Definitions

Symbol	Definition	Symbol	Definition
	Transfer of heat, hot surface	SN	Serial number of unit (located on sterilizer's data plate)
	Protective earth (i.e., ground)	V	Voltage rating of unit
	Electrostatic sensitive device	~	Alternating current
	Locked cycle or machine set up option	A	Amperage rating of unit
	Unlocked cycle or machine set up option	Hz	Frequency rating of unit
	Attention, consult manual for further instructions	Ø	Phase of the unit

INSTALLATION VERIFICATION

3

An Equipment Drawing showing all utility and space requirements was supplied with the sterilizer. Clearance space shown on the drawing is necessary for ease of installation and to assure proper operation and maintenance of equipment. Uncrating and Installation Instructions were also furnished with the sterilizer. If any of these documents are missing or misplaced, contact STERIS Corporation and provide the serial and model numbers of the equipment. Replacement copies will be sent to you promptly.

3.1 Installation Checklist

After installing this unit according to the instructions provided, complete the following checklist to assure that your installation is complete and correct. Or, if you desire, contact STERIS for a technician to be scheduled to test your installation and demonstrate proper equipment operation.

3.1.1 Service Clearance

CAUTION – POSSIBLE EQUIPMENT DAMAGE: Insufficient service clearance will make repairs more difficult and time-consuming.

- ❑ Clearance as specified on the equipment drawing must be available.

3.1.2 Plumbing Services

CAUTION – POSSIBLE EQUIPMENT DAMAGE: Piping sized too small may cause water hammer, resulting in damage to the sterilizer.

- ❑ **Feed Water:**
  - ❑ All supply line shutoffs must be provided with lockout capability.
  - ❑ Back flow prevention device installed.

    NOTE: *STERIS does not provide a backflow prevention device with the sterilizer.*
  - ❑ **Water Pressure** – measured (specification is 30 to 50 psig [2.1 to 3.5 bar], dynamic). Water pressure supplied must be within specifications as shown on the Equipment Drawing. If pressure is too high, a regulator must be installed. If water pressure is too low, equipment performance will be affected.
  - ❑ **Water Quality** – supplied must be within specifications. Improper water quality adversely affects equipment operation. Damage to the equipment due to improper water quality is not covered under warranty.
- ❑ **Steam Supply:**
  - ❑ Shutoffs (with provisions for lockout and tagout) located nearby.
  - ❑ Supply piping adequately sized.
  - ❑ Supply pressure measured (specification is 50 to 80 psig [3.5 to 5.52 bar], dynamic).

CAUTION – POSSIBLE EQUIPMENT DAMAGE: After installation, it is mandatory to brace piping at the drain funnel so it will not move vertically.

- ❑ **Drain Piping** must be sloped properly, and sized to handle the maximum waste flow from the sterilizer.

3.1.3 Electrical Service

- ❑ Electric single-phase service to the unit must be as specified on the Equipment Drawing and on the Sterilizer's Data Plate.
- ❑ Electric single-phase service requires a clearly marked disconnect with lockout/tagout capability located near the sterilizer and installed according to local codes.
- ❑ Electric single-phase service should be on a separate circuit, and not tied into circuits containing large reactive loads (e.g., motors).
- ❑ The protective earth ground must be connected to terminal block TB-1 in the sterilizer power box.

3.1.4 Sterilizer Final Check

- ❑ Chamber leveled properly.
- ❑ Door opens and closes smoothly.
- ❑ Door locked switches adjusted correctly.
- ❑ Chamber strainer in place.
- ❑ Rack and shelves and/or loading car operates correctly.
- ❑ Paper loaded in printer.
- ❑ Printer ribbon properly installed.
- ❑ Warranty labels properly applied.

3.1.5 Cycle Operation

- ❑ Unit powers up correctly.

⚠ WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

- ❑ Run Leak Test cycle – leak rate is to be less than 1.0 mm Hg/minute (1.3 mbar/min).
- ❑ Verify operation of a typical cycle (270°F [132° C] prevacuum).

3.2 Technical Specifications

3.2.1 Overall Size

- **16" Sterilizer:** 26" wide x 74-1/2" high x 35-3/4" deep (660 mm wide x 1892 mm high x 908 mm deep)
- **20" Sterilizer:** 30" wide x 74-1/2" high x 45-1/8" deep (762 mm wide x 1892 mm high x 1146 mm)

3.2.2 Weight (Fully Loaded)

- **16" Sterilizer:**

Single Door, Steam	750 lb (340 kg)
Double Door, Steam	989 lb (449 kg)
Single Door, Electric	890 lb (404 kg)

- **20" Sterilizer:**

Single Door, Steam	1231 lb (558 kg)
Double Door, Steam	1606 lb (728 kg)
Single Door, Electric	1371 lb (622 kg)
Double Door, Electric	1726 lb (782 kg)

3.2.3 Utility Requirements

- **Electric:**

Direct Steam:	120 Volt, 50/60 Hz, 1-phase, 9.5 Amps
Steam Generator:	208 Volt, 50/60 Hz, 3-phase, 83.2 Amps; 240 Volt, 50/60 Hz, 3-phase, 72.2 Amps; or 480 Volt, 50/60 Hz, 3-phase, 37 Amps (if equipped)

- **Water:**

Pressure:

Sterilizer	30 to 50 psig (2.1 to 3.5 bar)
Steam Generator (if equipped)	20 to 50 psig (1.4 to 3.5 bar)

Temperature:

Sterilizer	70°F (21°C) maximum
Steam Generator (if equipped)	140°F (60°C) optimum, 150°F (66°C) maximum

Consumption:

Sterilizer	6.0 gpm (23 lpm)
Steam Generator (if equipped)	6.0 gpm (23 lpm)

- **Steam:**

Pressure:	50 to 80 psig (3.5 to 5.2 bar)

- Consumption:

16" Direct Steam	83 lb/hr (38 kg/h)
20" Direct Steam	116 lb/hr (53 kg/hr)

3.2.4 Environmental Conditions

Temperature: 41 - 104°F (5 - 40°C)

Humidity: 85% noncondensing, maximum

Pollution Degree: 2

Installation Category (Overvoltage Category): II

A-Weighted Sound Power Level: 68 dBA (mean) -78 dBA (maximum)

TECHNIQUES OF STERILIZATION

4

4.1 General

The information in this section is intended as a general guide to steam sterilization techniques. Also recommended is reference to the standards of the Association for the Advancement of Medical Instrumentation (AAMI ST-46), Steam Sterilization and Sterility Assurance, 3rd Edition.

WARNING: The liquid cycle is for non-patient contact use only.

- Prior to sterilization, all materials and articles must be thoroughly cleaned.
- After sterilization, goods should be stored in conditions that will not compromise the barrier quality of their wrapping materials.

Important: Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

NOTE: *Contact STERIS® for information on a wide range of education/ training programs designed to meet the educational needs of healthcare industries.*

Cycle Default Status:
Factory-Default
Optional (Supervisor Access Only)

As part of the operator's verification of the sterilization process, biological indicators may be used to demonstrate that sterilization conditions have been met.

NOTE: *Contact STERIS for information on specific biological indicators recommended for use with this sterilizer.*

Table 4-1. AMSCO® C Series Prevacuum Sterilizer Cycles

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load Refer to **Table 4 (page iii)** for Recommended Quantities	Validation Standard
Prevac Cycle	270°F (132°C)	4 Minutes	20 Minutes*	Fabric Packs	ST-8:2008
Prevac Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Prevac Cycle	270°F (132°C)	4 minutes	5 Minutes	Single Fabric Pack	ST-8:2008
Prevac Cycle	275°F (135°C)	3 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008

Table 4-1. AMSCO® C Series Prevacuum Sterilizer Cycles (Continued)

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load Refer to **Table 4 (page iii)** for Recommended Quantities	Validation Standard
Immediate Use Prevac Cycle	270°F (132°C)	4 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument, or multiple unwrapped instrument trays, porous and non-porous loads. Maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
Gravity Cycle	250°F (121°C)	30 Minutes	15 Minutes	Fabric Packs	ST-8:2008
Gravity Cycle	270°F (132°C)	15 Minutes	30 Minutes	Double-wrapped instrument trays, non-porous load. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Gravity Cycle	250°F (121°C)	30 Minutes	30 Minutes	Double-wrapped instrument trays, non-porous load. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Gravity Cycle	270°F (132°C)	25 Minutes	15 Minutes	Fabric Packs	ST-8:2008
Immediate Use Gravity Cycle	270°F (132°C)	3 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, non-porous load. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Immediate Use Gravity Cycle	270°F (132°C)	10 Minutes	1 Minute		ST-8:2008
Liquid Cycle	250°F (121°C)	45 Minutes	N/A	Refer to **Table 5 (page iv)** for recommended quantities	ST-8:2008
6. Leak Test**	N/A	N/A	N/A	None	ST-8:2008
7. Dart Test**	270°F (132°C)	3-1/2 Minutes	1 Minute	Dart or Bowie-Dick Test Pack	ST-8:2008
8. Dart Warm-up**	270°F (132°C)	3 Minutes.	1 Minute	None	N/A

* *Dry time can be reduced to 5 minutes for a single fabric pack.*

** *Not adjustable.*

Table 4-2. AMSCO C Series SFPP Sterilizer Cycles

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load Refer to **Table 4 (page iii)** for Recommended Quantities	Validation Standard
SFPP Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
SFPP Cycle	270°F (132°C)	4 Minutes	20 Minutes	Fabric Packs	ST-8:2008
SFPP Cycle	275°F (135°C)	3 Minutes	30 Minutes*	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
SFPP Cycle	270°F (132°C)	4 Minutes	5 Minutes	Single Fabric Pack	ST-8:2008
Prevac Cycle	270°F (132°C)	4 Minutes	20 Minutes*	Fabric Packs	ST-8:2008
Prevac Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Prevac Cycle	270°F (132°C)	4 minutes	5 Minutes	Single Fabric Pack	ST-8:2008
Prevac Cycle	275°F (135°C)	3 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Immediate Use Prevac Cycle	270°F (132°C)	4 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument, or multiple unwrapped instrument trays, porous and non-porous loads. Maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
Gravity Cycle	250°F (121°C)	30 Minutes	15 Minutes	Fabric Packs	ST-8:2008
Gravity Cycle	270°F (132°C)	15 Minutes	30 Minutes	Double-wrapped instrument trays. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Gravity Cycle	250°F (121°C)	30 Minutes	30 Minutes		ST-8:2008

Table 4-2. AMSCO C Series SFPP Sterilizer Cycles (Continued)

Cycles:	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load Refer to **Table 4 (page iii)** for Recommended Quantities	Validation Standard
Gravity Cycle	270°F (132°C)	25 Minutes	15 Minutes	Fabric Packs	ST-8:2008
Immediate Use Gravity Cycle	270°F (132°C)	3 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, non-porous load. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
Immediate Use Gravity Cycle	270°F (132°C)	10 Minutes	1 Minute		ST-8:2008
Liquid Cycle	250°F (121°C)	45 Minutes	N/A	Refer to **Table 5 (page iv)** for recommended quantities	ST-8:2008
6. Leak Test**	N/A	N/A	N/A	None	ST-8:2008
7. Dart Test**	270°F (132°C)	3-1/2 Minutes	1 Minute	Dart or Bowie-Dick Test Pack	ST-8:2008
8. Dart Warm-up**	270°F (132°C)	3 Minutes	1 Minute	None	N/A

* *Dry time can be reduced to 5 minutes for a single fabric pack.*

** *Not adjustable.*

4.2 Immediate Use

Each of the sterilizers is programmed with one or more sterilization cycles intended to process items for "immediate use." Immediate use can be defined as the shortest possible time between a sterilized item's removal from the sterilizer and its aseptic transfer to the sterile field.

- A sterilized item intended for immediate use must not be stored.
- An item sterilized for immediate use cannot be held for use on a future case.
- The Prevac immediate use cycle is the preferred immediate use cycle to use. The Gravity immediate use cycle is only safe for simple instruments that contain no hinges or other features that could trap air.

4.3 Control Measures for Verifying Sterilization Process

A live spore test utilizing *B. stearothermophilus* is the most reliable form of biological monitoring. This type of product utilizes controlled populations of a controlled resistance, so that survival time and kill time can be demonstrated.

To verify the process, insert the biological indicator in a test pack and place pack on the bottom shelf. Run test pack through a typical cycle. On completion, forward test pack and monitor to appropriate personnel for evaluation. Refer to AAMI guidelines to conduct routine biological monitoring.

4.3.1 Biological Monitors

Tests such as the Dart® (Daily Air Removal Test) or Bowie-Dick are designed to document the removal of residual air from a sample challenge load.

Run a Dart (Bowie-Dick test) cycle daily before processing any loads in a sterilizer equipped with prevacuum cycles. The first prevacuum cycle of each day should be used to test the adequacy of air removal from the chamber and load, so that steam can penetrate the load. It is not a test for adequate exposure to heat in terms of time-at-temperature.

4.3.2 Testing for Prevacuum Efficiency

In the case of these tests, following exposure in a prevacuum sterilizing cycle, the pack is opened, the indicator examined, and conclusions are drawn as to the pattern of residual air, if any, that remained in the pack during the sterilizing cycle. Any indication of a malfunction must be reported to the supervisor. Sterilizer must not be used again until approved by supervisor.

⚠ WARNING – STERILITY ASSURANCE HAZARD: Load sterility may be compromised if the biological indicator or vacuum leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

4.4 Dart (Bowie-Dick) Test

The Dart (Bowie-Dick) Test is designed to document the removal of residual air from a sample challenge load in a prevacuum sterilizer. This test does not apply to gravity, liquids or SFPP cycles.

In the case of this test, following exposure in a prevacuum test cycle, the pack is opened, the indicator examined and conclusions are drawn as to the pattern of residual air, if any, that remained in the pack during the sterilizing cycle. Any indication of a malfunction must be reported to the supervisor. Sterilizer must not be used to run prevacuum cycles until approved by supervisor.

According to AAMI ST-79, a steam penetration test shall be carried out at the beginning of each day the sterilizer is to be used. Refer to instructions for running the Dart test cycle in *SECTION 6, STERILIZER OPERATION*. Dart test packs are designed to expose the pattern and document the removal of residual air from the sample load. Any test package must be constructed in accordance with instructions given in the AAMI ST-46 standard.

***NOTE:** The Dart test cycle is not a test for adequate exposure to heat in terms of time-at-temperature.*

⚠ WARNING – STERILITY ASSURANCE HAZARD: Load sterility may be compromised if the biological indicator or vacuum leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

4.5 Vacuum Leak Test

The Vacuum Leak Test (see appropriate cycle description in *SECTION 6, STERILIZER OPERATION*) measures the integrity of the sealed pressure vessel and associated piping to assure air is not being admitted to the sterilizer during the vacuum drawdowns.

After running a Leak Test cycle, a value or leak rate will be printed on the printer tape. This value will help define a trend over a period of time if the integrity of the system begins to deteriorate (i.e., allowing air to enter the system). By running a Leak Test cycle daily or weekly, the operator or maintenance personnel can always monitor the air tightness of the system and make repairs or adjustments when necessary.

***NOTE:** A leak rate of greater than 1 mmHg per minute indicates a problem with the sterilizer that must be addressed.*

WARNING – STERILITY ASSURANCE HAZARD: Load sterility may be compromised if the biological indicator or vacuum leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

4.6 Recommendations for the Sterilization Process

Process all goods using prevacuum cycles. The AMSCO C Series small steam sterilizer is not a gravity displacement sterilizer. Run gravity cycles only when qualified personnel have evaluated the loads and determined the efficacy of a gravity cycle.

Saturated steam is a well controlled, reliable method for processing items which can withstand the temperatures and pressures associated with steam sterilization. The requirements for achieving reproducible results are well known by many users, but are not always understood.

The condition most likely to result in sterilization problems is a failure to completely remove air from items being sterilized. For example, placing an empty beaker or bowl in an upright position in a gravity displacement sterilizer may result in the object not being sterilized, or may require exceptionally long sterilization times. This problem is caused by air trapped in the object; air has almost twice the density of saturated steam under the same conditions. Thus, air remains in the container's bottom while steam forms a stable layer above it. (Similar to oil forming a stable layer over water.) As long as there is no mechanism for actively mixing air and steam, the bottom of the container is only exposed to dry heat, which is not an effective sterilization method at the time and temperatures typically used in steam processes.

The best method for enhancing sterilization of solid-bottom containers in gravity displacement cycles is to orient all objects in a position which would allow water to flow out. When steam enters the chamber, it tends to layer over trapped air. If, however, an object is oriented so air is not trapped, but can flow out; air flows out to be replaced by steam. Steam can now reach all surfaces and effect sterilization.

4.7 Techniques of Sterilization for Liquid Cycle

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: Avoid personal injury from bursting bottles. Liquid sterilization cycle must only be used for liquids in borosilicate (Pyrex) flasks with vented closures.

WARNING: The liquid cycle is for non-patient contact use only.

WARNING – BURN HAZARD: When sterilizing liquids, you must observe the following procedures:

- **Use Liquid cycle only.**
- **Use only vented closures.**
- **Use only Type I borosilicate glass bottles.**
- **Do not allow hot bottles to be jolted.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

CAUTION – POSSIBLE EQUIPMENT DAMAGE: Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.

Important: The liquid cycle is for non-patient contact use only.

Refer to **Table 4-3** for recommended Liquid cycle parameters. The recommended times indicated in **Table 4-3** assume the use of vented bottles. Minimum recommended sterilization time (fourth column) includes the time required to bring the solution up to the sterilize temperature plus the time required to achieve sterilization.

Table 4-3. Liquid Cycle Processing Guidelines

Sterilizer Size	Number of Containers for Full Load	Volume of Liquid in One Container	Minimum Recommended Sterilize Time at 250°F (121°C) in minutes
16 x 16 x 26" (406 x 406 x 660 mm)	15	1000 mL	45
20 x 20 x 38" (508 x 508 x 965 mm) with Loading Car	32		
20 x 20 x 38" (508 x 508 x 965 mm) with Rack and Shelves	28		

4.8 Recommendations for Sterilizing Liquids

WARNING – EXPLOSION HAZARD: The liquid cycle is for non-patient contact use only.

WARNING – PERSONAL INJURY HAZARD: Avoid personal injury from bursting bottles. Liquid sterilization cycle must only be used for liquids in borosilicate (Pyrex) flasks with vented closures.

WARNING – BURN HAZARD: When sterilizing liquids, you must observe the following procedures:

- **Use Liquid cycle only.**
- **Use only vented closures.**
- **Use only Type I borosilicate glass bottles.**
- **Do not allow hot bottles to be jolted.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

CAUTION – POSSIBLE EQUIPMENT DAMAGE: Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.

Important: Read the following paragraphs before sterilizing any liquids in your sterilizer. The liquid cycle is for non-patient contact use only.

Borosilicate glass is required because it is a superior glass capable of resisting thermal shock. If glass not as thermally resistant is used, a greater potential for bursting exists.

Vented closures are required because, by design, they release internal pressure build-up by automatically venting the containers, whereas pressure in unvented containers remains until the contents have cooled. Examples of vented closures are shown in Figure 4-1.

When loading, place small bottles in a separate basket to minimize sliding. Always use side rails on the loading car to prevent containers or baskets from falling off.

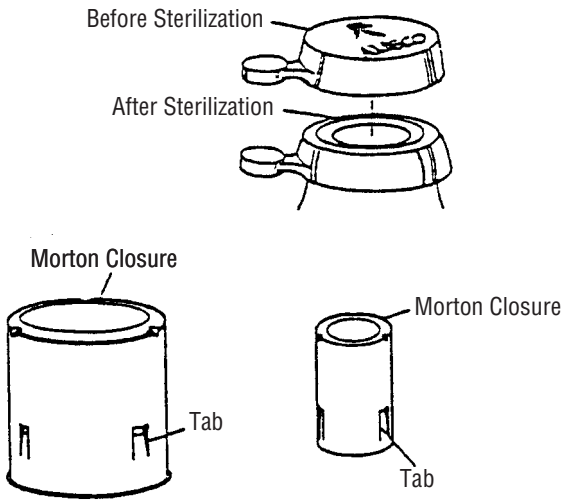


Figure 4-1. Vented Closures

4.9 Sterilization of Implantable Devices

A healthcare facility must develop adequate monitoring practices for the sterilization of implantable devices. Refer to AORN recommended practices for more information.

Sterilization of implantable devices by a healthcare facility must be monitored:

- When sterilizing an implantable device, *always* place a biological monitor in the load.
- Following sterilization, *implant must be quarantined* until the biological monitor has been incubated and read by a qualified person.

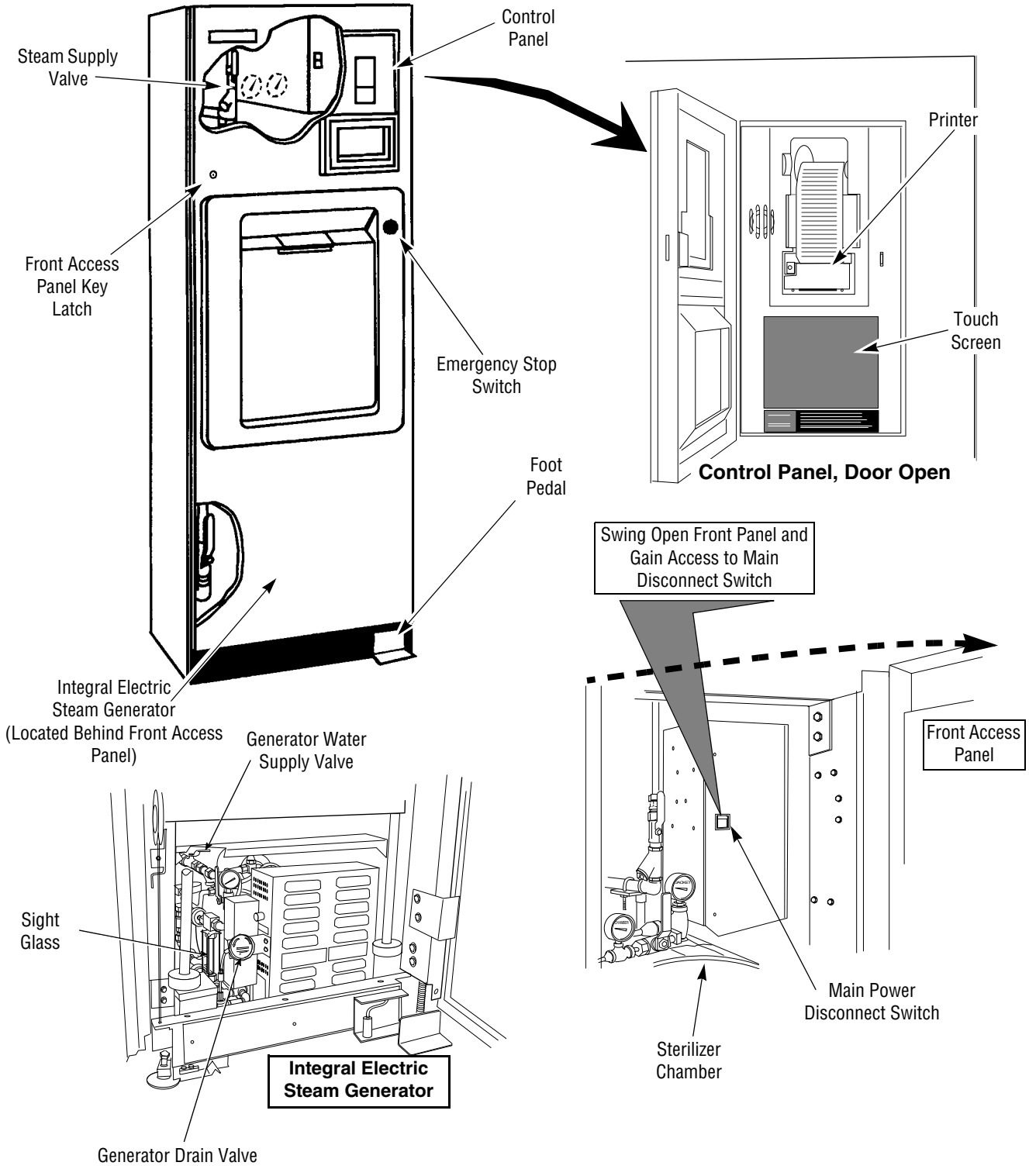


Figure 5-1. AMSCO C Series Small Steam Sterilizer Control Components

5.1 General

Use this manual to become familiar with control locations and functions before operating the sterilizer (refer to Figure 5-1). The controls for this sterilizer are contained within the control touch screen. Control touchpads appear on the screen as needed during each operation. Available controls change as the sterilizer steps through different operations.

5.2 Main Sterilizer and Cycle Controls

- **Main Power Disconnect Switch** (refer to Figure 5-1) – Located on the sterilizer's main control box (right-hand side as facing operating end), this switch disconnects power to the control. Under normal operation, this switch is left in the ON position at all times, and accessed only when servicing the sterilizer.
- **Steam Supply Valve** – This is located behind the side access panel (or within the wall enclosure), above the chamber. Refer to Figure 5-2. Ensure this is in the open position before trying to operate the sterilizer.
- **Water Supply Valve** – This is located behind the side access panel (or within the wall enclosure, below the chamber. Refer to . Ensure this is in the open position before trying to operate the sterilizer.
- **Chamber Emergency Manual Exhaust Valve** – Used only in emergency situations, the valve is to be left in the closed position for normal operation. Refer to *SECTION 5, EMERGENCY DOOR OPENING PROCEDURE*.
- **Sterilizer Control Touchpad** – This is visible on the control touch screen whenever the sterilizer is in Standby mode. Refer to *SECTION 5.5, OPERATING END CONTROL PANEL ON PAGE 5-6* for more information.

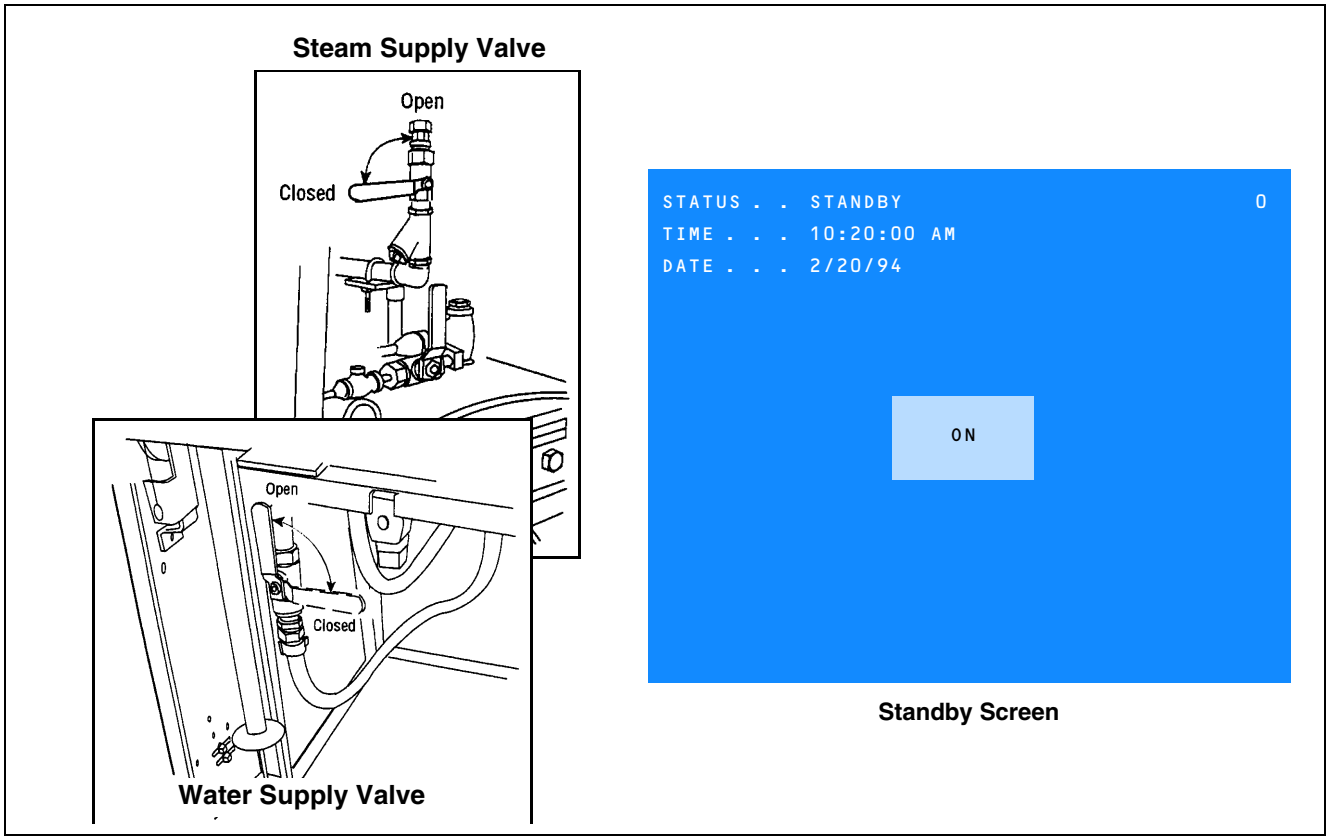


Figure 5-2. Basic Controls

NOTE: *Touch-screen pads respond to very slight pressure, and only need to be pressed lightly.*

The sterilizer enters operating mode when the ON touchpad is pressed. This touchpad switches the sterilizer control between Standby and Ready conditions. Standby mode is usually used when the sterilizer is not being operated – steam is turned off and machine cools, saving energy.

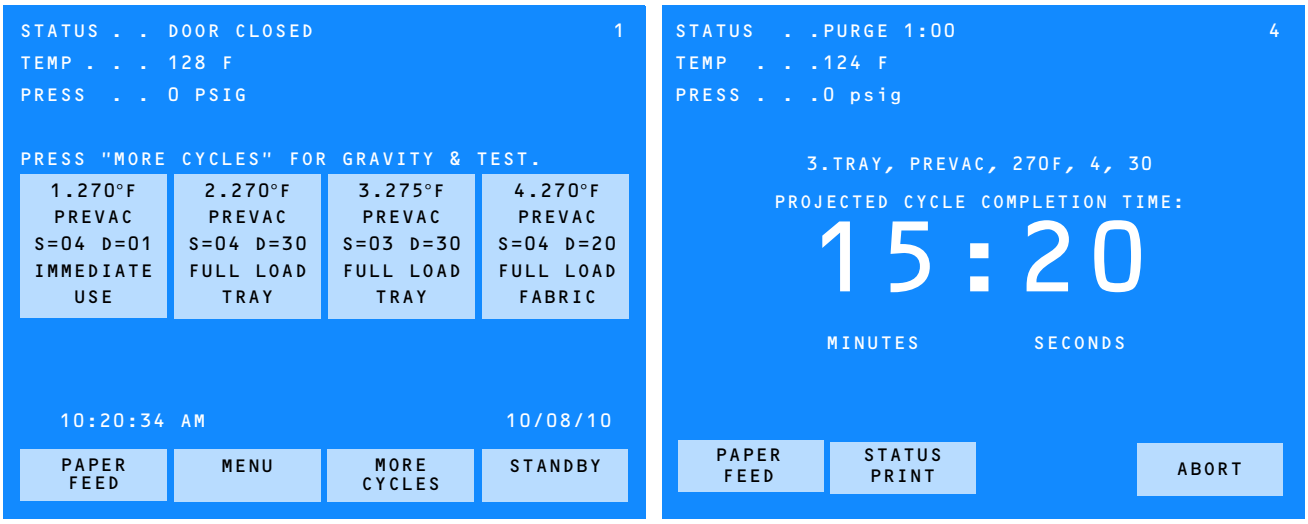
A screen reference number appears in the upper right corner of each display. Numbers are used for reference only, and do not relate to the operating sequence of the screen.

5.3 Control Displays

Control displays can be divided into two categories, those occurring when the sterilizer is “out-of-cycle” and those occurring when the sterilizer is “in-cycle.”

Typical out-of-cycle and in-cycle displays are shown in Figure 5-3:

- Out-of-cycle displays are used to start cycles, or set up and adjust sterilizer operation. With the exception of the cycle starting displays, most out-of-cycle displays will only be used occasionally. Detailed instructions for adjusting the sterilizer operating parameters are in Section 7, Cycle and Control Value Programming.
- Generally, when the sterilizer is in-cycle, displays appear automatically and, unless an abnormal condition occurs, require no special attention or instructions. In-cycle displays tell the operator at what temperature and pressure the sterilizer chamber is operating, show the current cycle phase, and indicate when the processing cycle is complete. For more details about operating cycles, refer to Section 6, Sterilizer Operation.



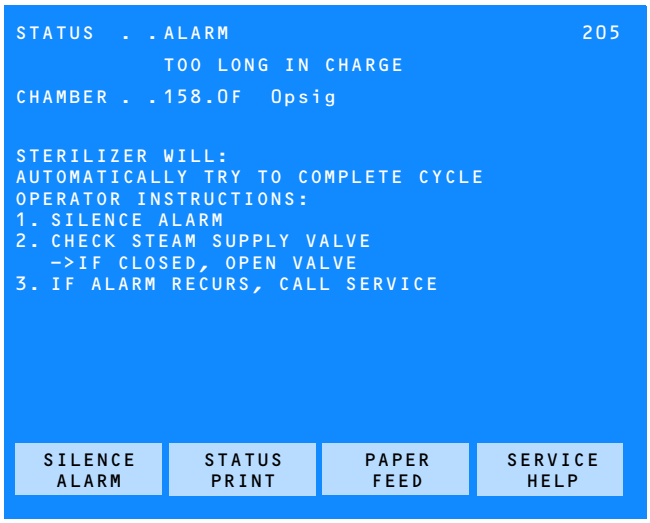
Out-of-Cycle **In-Cycle**

Figure 5-3. Typical Out-Of-Cycle and In-Cycle Displays

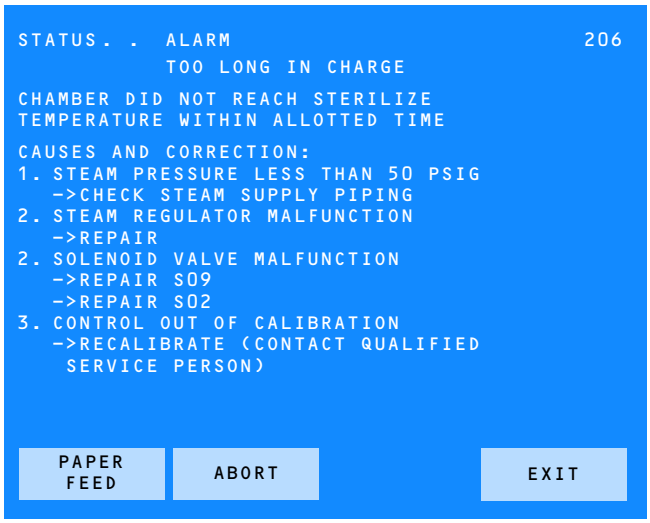
5.4 Alarm Displays

Alarm displays tell operators and technicians when the sterilizer is experiencing an abnormal condition. Alarm conditions can be caused by failure of utility supplies or sterilizer components. *SECTION 9, TROUBLESHOOTING* details the steps an operator can take to solve most alarm conditions. Example alarm displays are shown in Figure 5-4.

When an alarm occurs during cycle operation, a display appears on the screen, accompanied by an audible tone. This display indicates the problem as determined by control sensors, and lists a brief troubleshooting list. The operator should follow the instructions on the screen, if possible. If these instructions fail to clear the alarm, consult your departmental supervisor or a trained service technician before using the sterilizer further.



Alarm Notification Screen



Alarm Service Information Screen

Figure 5-4. Alarm Display Examples

5.5 Operating End Control Panel

A sterilizer equipped with two doors will also be equipped with two control panels. The control panel at the loading door of the sterilizer is referred to as the “operating end control” (OE control); the control panel located at the unloading door is referred to as the “non-operating end control” (NOE control).

A single-door sterilizer is equipped with an “operating end control” only.

***NOTE:** Except for the presence of the printer (which is only present at the operating end of the unit), control panels at both ends of the unit are similar and each can be used to start or abort the sterilizer.*

The operating end control panel (see Figure 5-5) is used to:

- Select and start cycles
- Abort cycles
- Set cycles and cycle values
- Obtain status printouts (see “Printer” paragraph later in this section)

The operating end control includes a printer for cycle documentation.

Cycle status and control messages are shown on a 30 line x 40 column graphics display. Cycles can be started or aborted using the touch screen pads. Cycles and cycle values can be set using the Change Values procedure (accessible from the sterilizer MENU screen). If changing cycle values becomes necessary, refer to Section 7, Cycle and Control Value Programming of this manual.

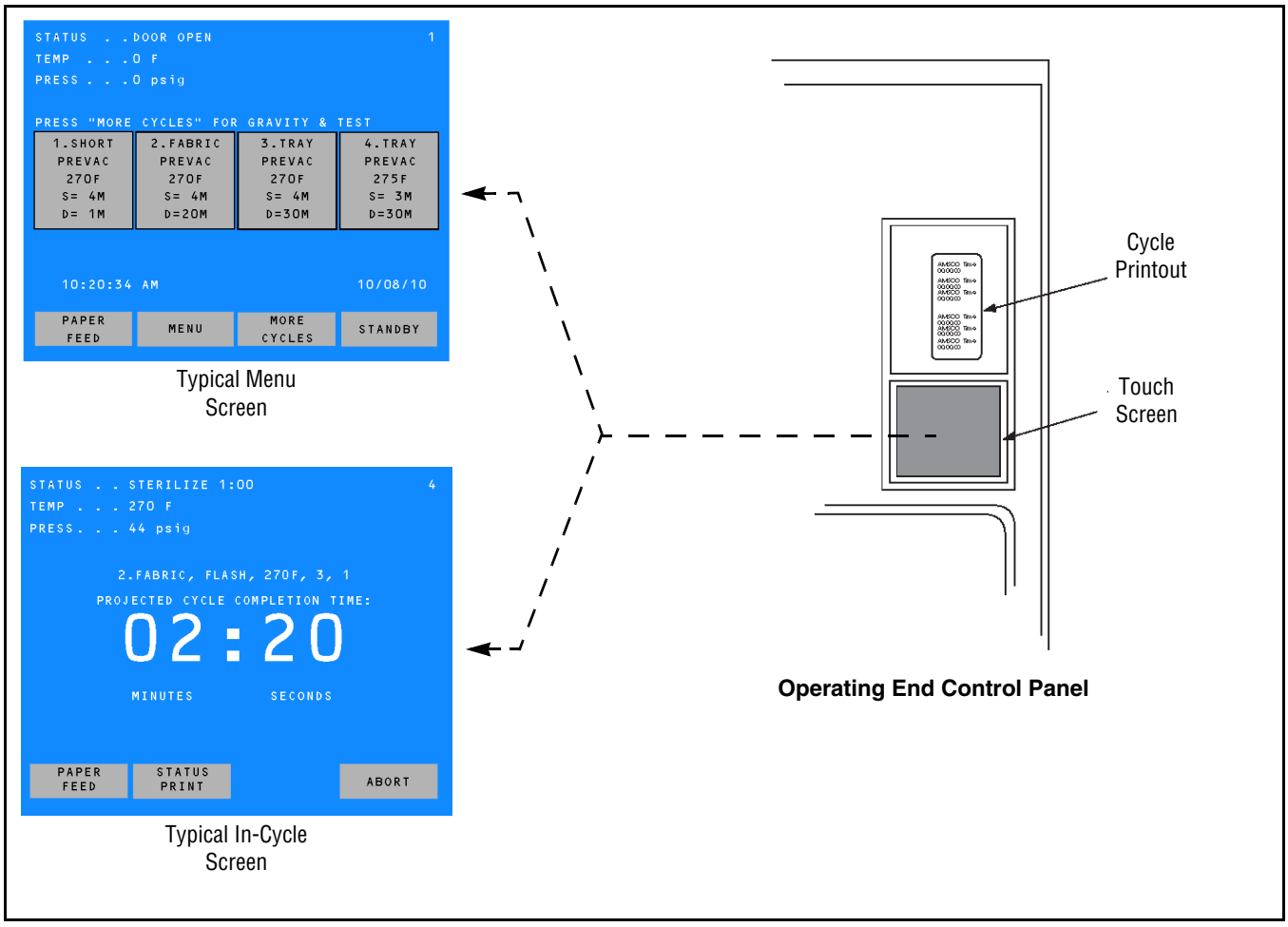


Figure 5-5. Control Panel

5.6 Cycle Selection Touch-screen Pads

Four cycle selection touchpads are shown on the screen in Figure 5-6. These pads display the basic parameters of the cycle:

- Cycle name
- Sterilization exposure temperature
- Sterilization exposure time
- Dry time

Additional cycles may be selected by pressing MORE CYCLES. Details on individual cycles are in *Section 6, Sterilizer Operation*.

The AMSCO C Series Small Steam Sterilizer control can be programmed to retain values for up to 12 separate cycles. User-defined cycle names can be entered for cycles 1 and 2 on the cycle selection screen.

- **Prevacuum Sterilizers** – The first six cycles (1 through 6) are the factory default cycles and are routinely displayed on screen #1 (press MORE CYCLES to access cycles 5 and 6). Up to six additional cycles can be programmed and displayed.
- **Steam Flush Pressure Pulse (SFPP) Sterilizers** – The first five cycles (1 through 4) are the factory default cycles and are routinely displayed on screen #1 (press MORE CYCLES to access cycle 5). Up to seven additional cycles can be programmed and displayed.

Important: Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to follow the device manufacturer's written instructions.

Dart® (Bowie-Dick) and Leak Test cycle parameters are fixed; the buttons for these cycles do not display values for exposure temperature, exposure time or drying time.

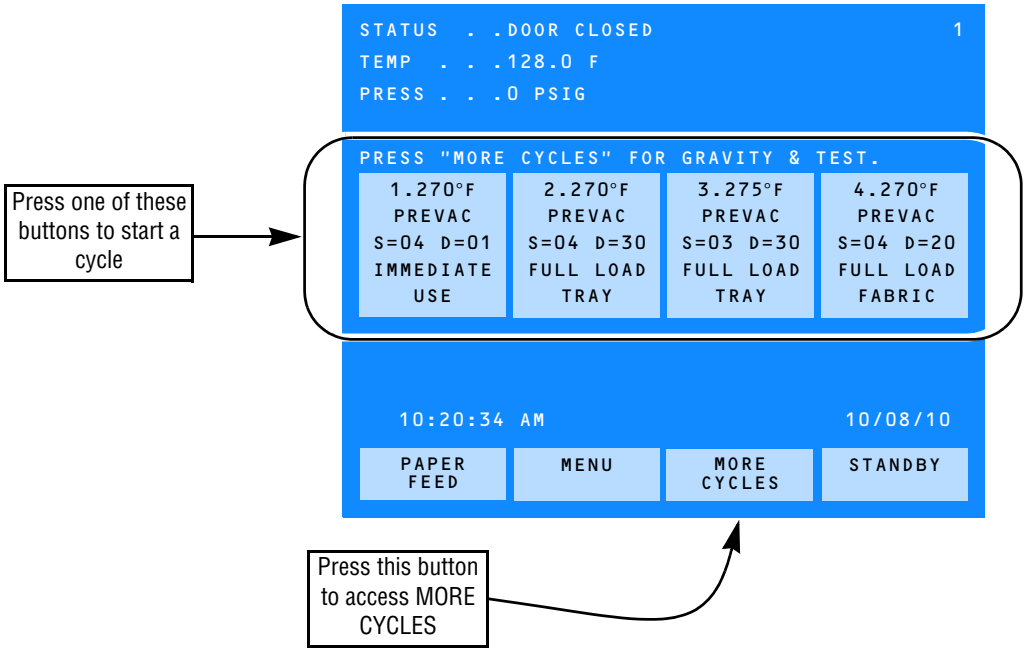

STATUS . .DOOR CLOSED 1
TEMP . . .128.0 F
PRESS . . .0 PSIG
PRESS "MORE CYCLES" FOR GRAVITY & TEST.
1.270°F PREVAC S=04 D=01 IMMEDIATE USE
2.270°F PREVAC S=04 D=30 FULL LOAD TRAY
3.275°F PREVAC S=03 D=30 FULL LOAD TRAY
4.270°F PREVAC S=04 D=20 FULL LOAD FABRIC
10:20:34 AM 10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
Press one of these buttons to start a cycle
Press this button to access MORE CYCLES

Figure 5-6. Cycle Selection Touchpads

5.6.1 Values Touch-Screen Pads

The values touch-screen pads are accessed through the MENU screen by pressing **CHANGE CYCLE VALUES** (refer to Figure 5-7). These pads are used for changing the operating values used in cycles, changing the cycles displayed on the cycle selection menus and for changing the operating settings of the sterilizer. Instructions for changing sterilizer cycle parameters are in Section 7, Cycle and Control Value Programming.

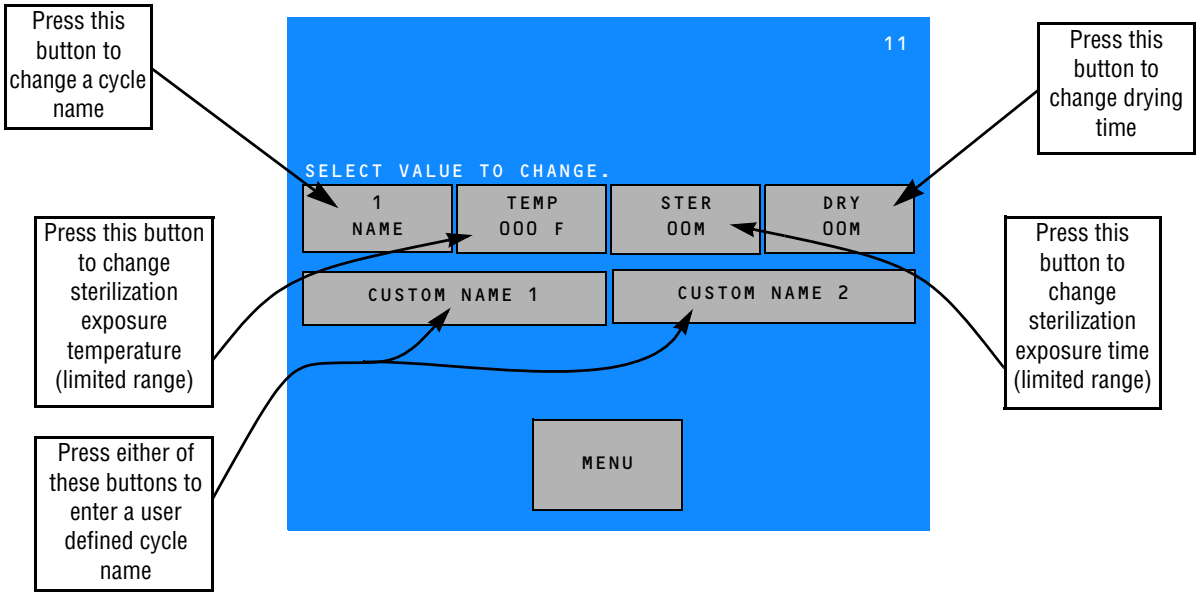


Figure 5-7. Values Touch-Screen Pads

5.6.2 Abort Touch-Screen Pad

The Abort touch-screen pad is used to end a cycle before it finishes normally. A cycle only needs to be aborted if an abnormal condition or a control problem develops during the cycle. Pressing Abort causes the sterilizer chamber to depressurize (if pressurized), or Air Break (if in vacuum); the door seal deactivates, the control prompts the operator to open the door and the sterilizer returns to its normal out-of-cycle state. If an abnormal condition persists after fully aborting the cycle, contact your supervisor or a qualified service technician before trying to operate the sterilizer further.

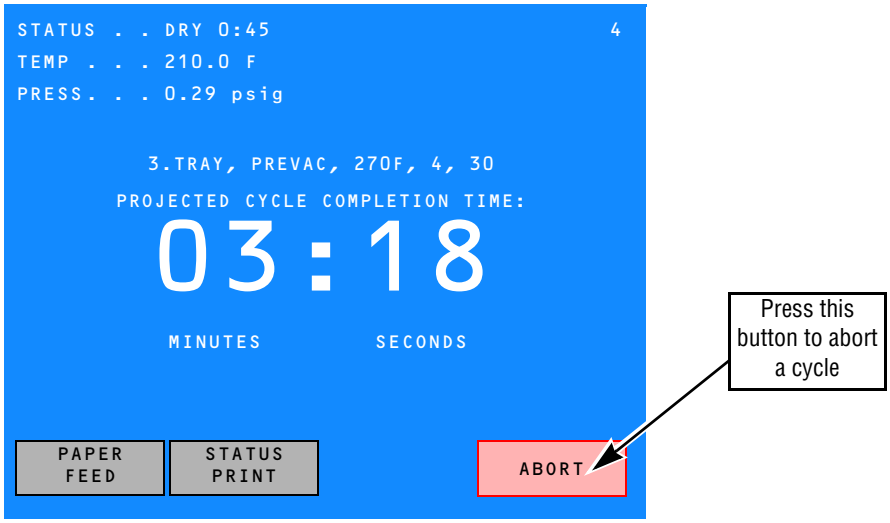
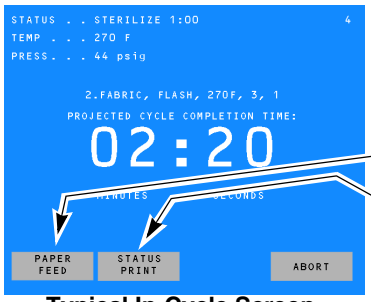
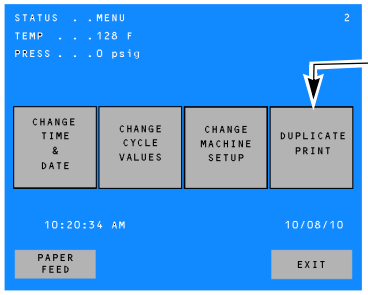


Figure 5-8. Cycle Abort Touch-Screen Pad

5.7 Printer



Typical In-Cycle Screen



Menu Screen

Refer to Figure 5-9

Printer records all cycle data on 2-1/4" (57 mm) wide single-ply paper. See *SECTION 8, ROUTINE MAINTENANCE* for paper changing procedure. Printer functions controlled by touch-screen pads are as follows:

- **Paper Feed** – (appears on typical In-cycle screen) Press to feed out paper from the roll stored inside the control. Accessible during all phases of operation, including alarm conditions. Press and hold for continuous feed.
- **Status Print** – (appears on typical In-cycle screen) Press to obtain a printout of current cycle phase and conditions (when unit is in cycle). This touchpad is only visible during cycle operation.
- **Duplicate Print** – (appears on Menu screen) Press to obtain a complete duplicate printout of the last previously run cycle (when unit is not in cycle). This touchpad is only visible on the screen during Complete and Change Values menu. The Duplicate Print touch screen pad is not visible upon first power-up of the day.

5.8 Printouts

Refer to Figure 5-9

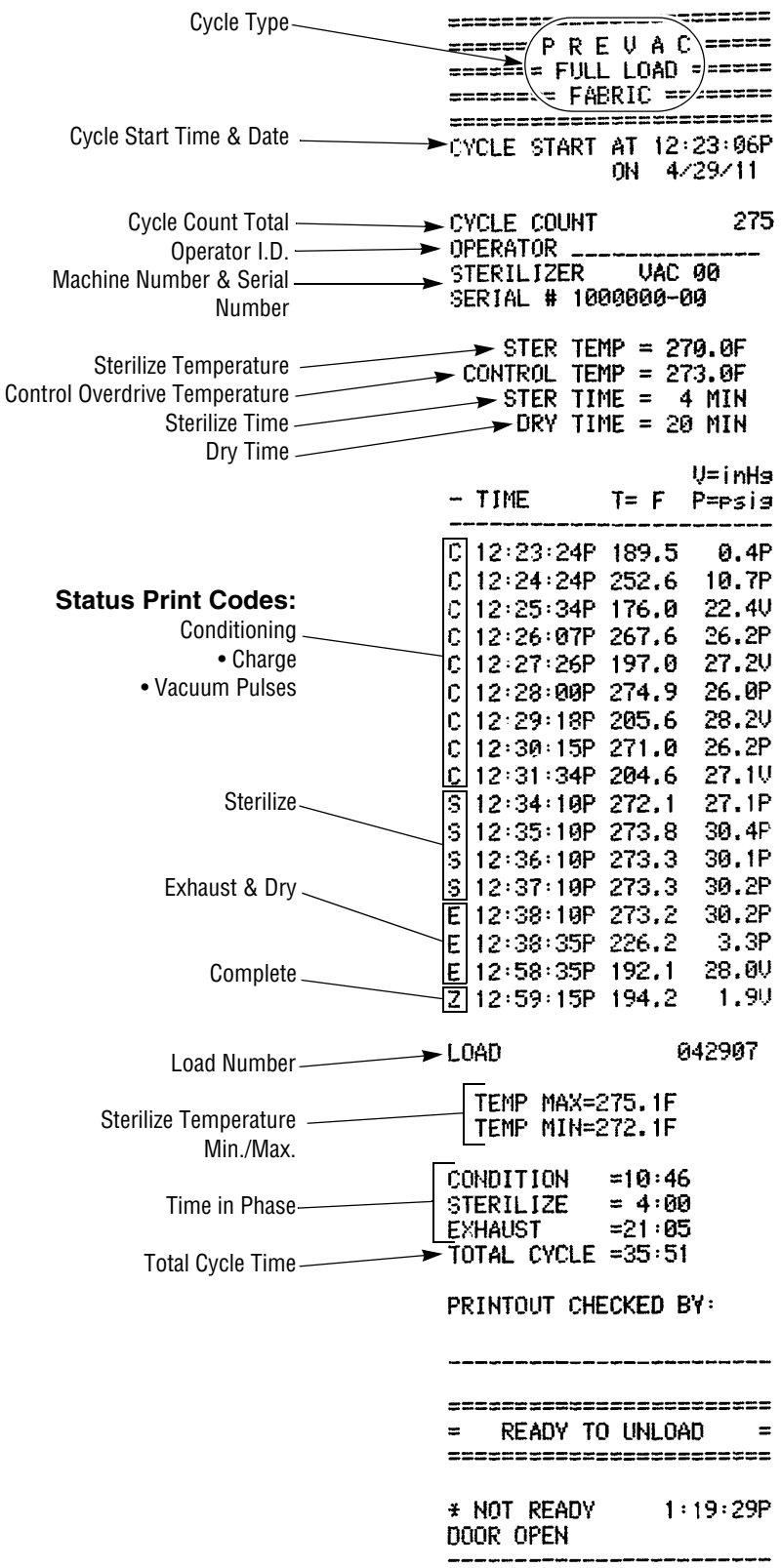
The printout reports useful information about each cycle the sterilizer runs. This includes the load number, which is a unique identifying code. Each load number is printed in the following format:

- Two-digit month (e.g., April = 04)
- Two-digit day (e.g., twenty eighth day = 28)
- Two-digit daily cycle count (e.g., first cycle = 01, second = 02, etc.).

Example of a complete load number: “042801” (April 28, first cycle).

During the cycle, status lines on the printouts show the time the line was printed, chamber temperature and the level of vacuum or pressure in the chamber. Each status line also begins with a letter code. This code indicates during which cycle phase the print line occurred, or what kind of event caused the print line to occur.

Refer to Figure 5-9 for other printout features.



Status Print Codes:

- Conditioning
  - Charge
  - Vacuum Pulses
- Sterilize
- Exhaust & Dry
- Complete

Additional Status Print Codes:

F = Alarm (Failure)
L = Leak Test (Vacuum or Hold)
D = Demand Print (Print Status)

Figure 5-9. Typical Printout

5.9 Power-Door Operation

The sterilizer door is operated at the foot pedal (refer to Figure 5-10).

- Pressing the foot pedal while the door is in the closed (up) position causes the door to open (lower).
- Pressing the foot pedal while the door is in the open (lowered) position, causes the door to close (by raising).

On double door units, there is no control of the power door at the opposite end of the unit. Each door of a double door sterilizer is operated from the end at which the door is located.

Important: Keep the door closed when the unit is not in use.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and ensure opening is clear of any obstructions.

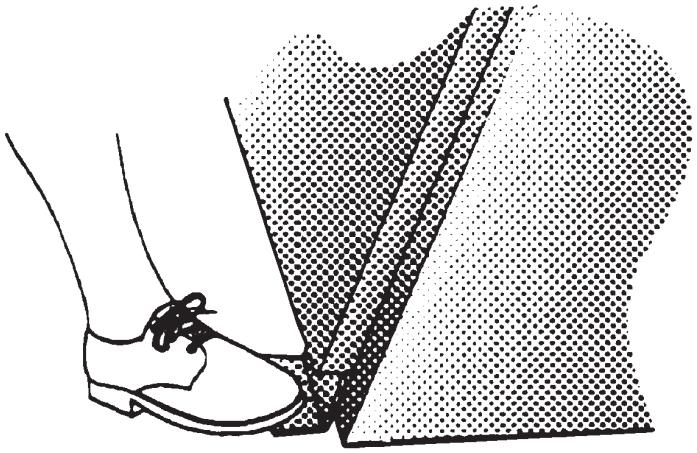


Figure 5-10. Power Door Floor Pedal

5.10 Emergency Door Opening Procedure

WARNING – BURN HAZARD: Do not attempt to open sterilizer door if a water in chamber alarm condition exists.

This procedure should only be used when pressure remains in the sterilizer chamber, and the door cannot be opened normally because the sterilizer has lost either electrical or water utilities.

- Use emergency door opening procedure to retrieve a load trapped in the chamber.
- This procedure requires pushing on the door cover to retract the door seal into the groove, then pushing the door downward manually.

Procedure:

1. Swing open the access panel of the sterilizer. Open the emergency exhaust hand valve until chamber exhausts to 0.0 psig. See Figure 5-11.
2. Using the door release tool provided, press on the upper left hand and right hand corners of the chamber door (see Figure 5-11). The door should give inward slightly, indicating that the seal has been pushed into the groove. The door must "bottom out" against the metal end-frame of the sterilizer chamber.
3. Close the access panel of the sterilizer.
4. Press down on the door handle to lower the door. The door will slide stiffly, so be prepared to press down hard.

   Once the door is open, do not use the sterilizer until the unit has been examined by a qualified service technician. Further use without attention may damage the sterilizer.
5. Close the emergency exhaust valve.

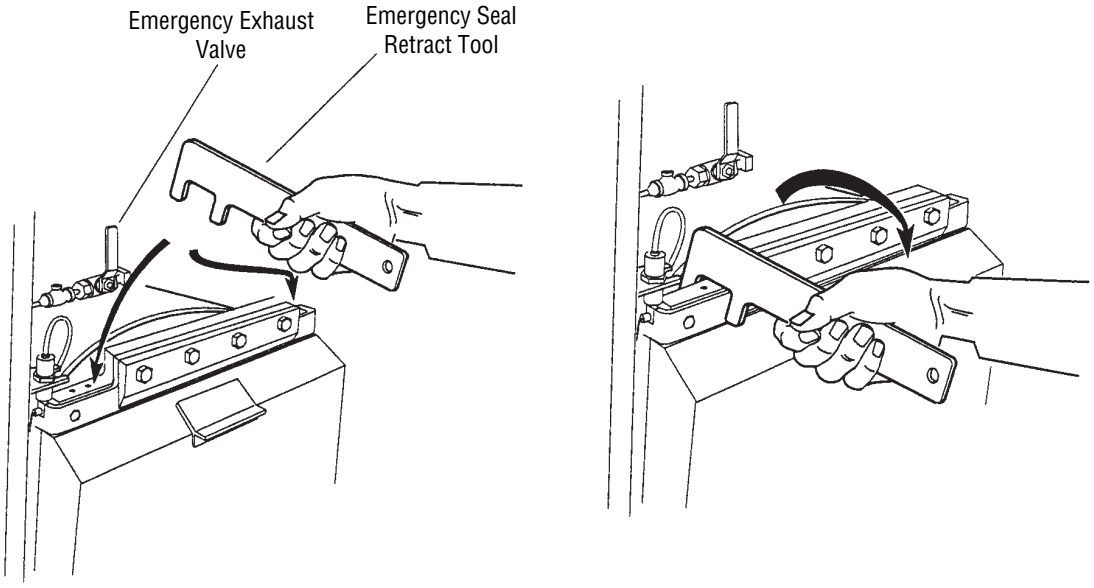


Figure 5-11. Emergency Door Opening Procedure

5.11 Emergency Stop Switch

An emergency stop switch (Figure 5-12) is a safety feature designed to shut the sterilizer down completely in an emergency situation. Pressing the emergency stop switch disconnects power to the door and valves, causing the door to stop and most valves to close, except S1 and S40, which are normally open, and will open when the emergency stop switch is pressed.

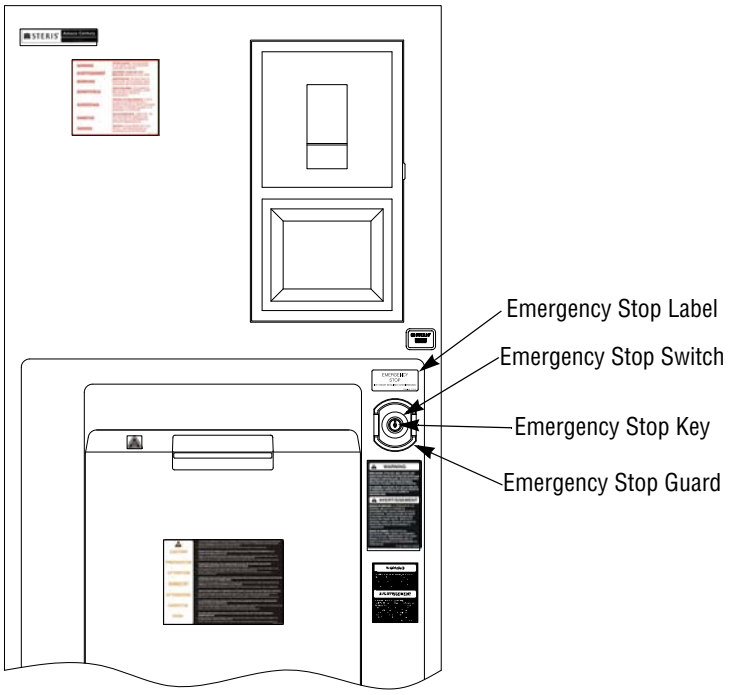


Figure 5-12. Emergency Stop Switch, Key and Guard

Important: The emergency stop switch is for emergency use only! **DO NOT USE AS A START/STOP SWITCH**. To properly abort a cycle, press abort button on sterilizer display.

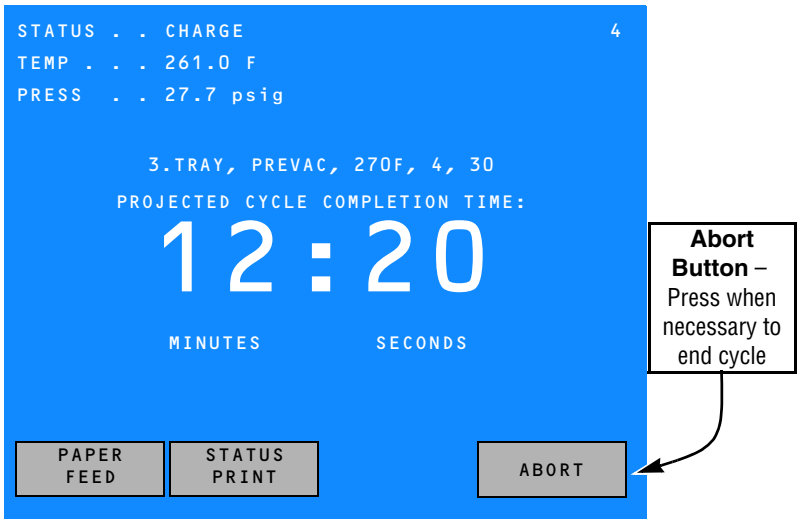


Figure 5-13. Press Abort Button to End Cycles When Needed

The emergency stop switch should be pressed only in an emergency situation such as

- Safety mechanism fails to stop door when an obstruction is present
- Steam enters the chamber when the door is open

NOTE: *An alarm is generated when the emergency stop switch is pressed. An emergency stop key is required to reset the switch. Refer to alarm procedure to clear alarm.*

5.11.1 Emergency Stop Key

An emergency stop key is required to reset the emergency stop switch.

NOTE: *The emergency stop key should be retained by the department supervisor.*

Resetting the Switch:

1. Insert emergency stop key.
2. Turn emergency stop key counterclockwise.
   a. Alarm clears
   b. Cycle aborts
   c. Sterilizer resumes normal operation

5.11.2 Emergency Stop Guard

The emergency stop guard (see Figure 5-12) helps prevent the operator from accidentally pressing the emergency stop switch.

5.11.3 Emergency Stop Label

The emergency stop label is located above the emergency stop switch (see Figure 5-12 and Figure 5-14).

Figure 5-14. Emergency Stop Label

5.12 Optional Electric Steam Generator

If a building steam source is not available, the sterilizer may be equipped with an electric steam generator. The generator automatically converts water to steam using electric heat. Electrically-heated steam created is then used to charge the sterilizer chamber.

All integral steam generators are equipped with an automatic flush and drain mechanism. Steam generators are highly susceptible to mineral scaling if the supplied water has any level of hardness. Refer to Section 7.5.4, Steam Generator Flush and Drain Set Up on page 7-20 for water quality requirements and to set the time of day and duration for the integral generator flush cycle.

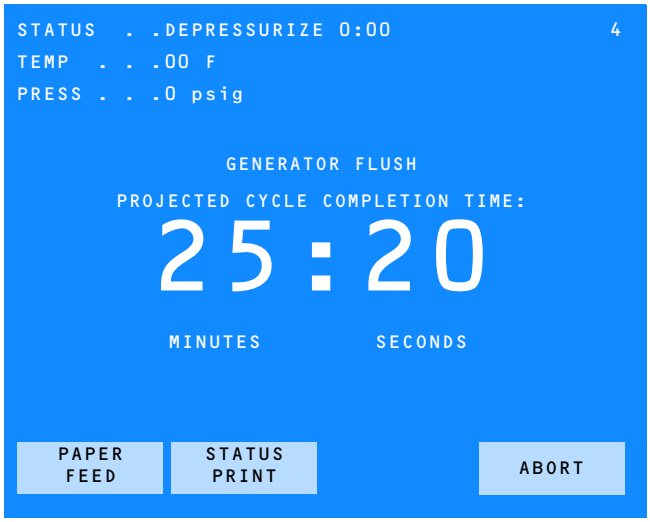
Important: Regardless of the hardness level of supplied water, the generator must be flushed every day before use to prevent mineral scaling or carryover of debris into the chamber.

ATTENTION: *Warranty on this steam generator will be voided unless daily flushing procedures are performed.*

Daily Generator Flush Cycle

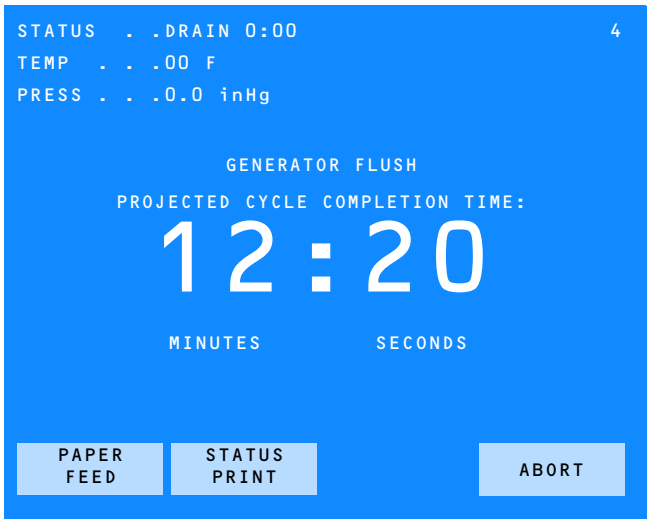
The generator flush cycle is automatic and occurs as scheduled by the sterilizer operator using the procedure in Section 7.5.4, Steam Generator Flush and Drain Set Up on page 7-20.

The sterilizer initiates a flush of the generator's boiler at the time scheduled during set up.



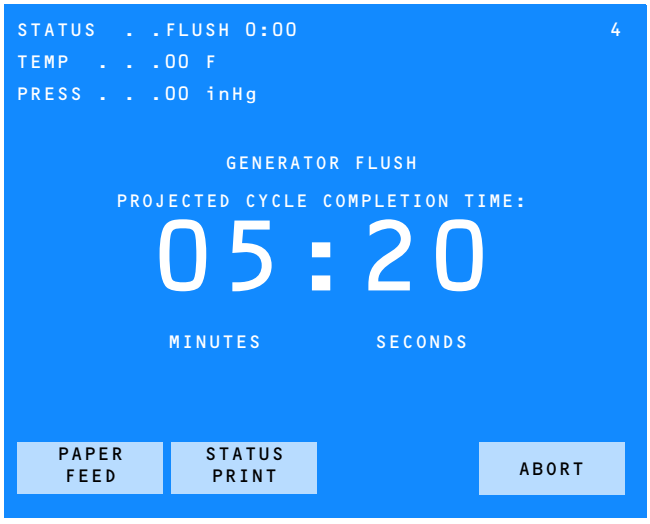
DEPRESSURIZE – The generator depressurizes and cools.

Important: The depressurization phase requires several minutes to complete.



DRAIN – Boiler drain opens, allowing water to drain.

NOTE: *Heater elements are OFF during Drain phase.*



FLUSH – Water flows through the boiler chamber for 5, 10 or 15 minutes as selected by the user (see Section 7.5.4, Steam Generator Flush and Drain Set Up on page 7-20).

Once FLUSH is complete, the boiler chamber fills and reheats water. Approximately 10 - 15 minutes are required to build a head of steam suitable for running a sterilization cycle.

STERILIZER OPERATION

6

6.1 Before Operating the Sterilizer

WARNING – BURN HAZARD: Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.

WARNING – PERSONAL HAZARD: To prevent falls keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

Operate sterilizer by referring to the appropriate cycle description in this section. The information in *SECTION 6.1* through *SECTION 6.7* are general instructions that apply to all cycle operations.

1. Press ON touch-screen pad on the sterilizer control display.

   Printer records time and date that power is turned ON.

2. Open chamber door.
3. Check that drain strainer is clean and in place and that chamber interior is clean. See *SECTION 8, ROUTINE MAINTENANCE*, if cleaning is necessary.
4. Close chamber door.
5. Under normal operation utility supply valves remain open. Verify valves are in OPEN position (see Figure 6-1).
6. Open control access door.
7. Check printer paper roll.
   a. A colored warning stripe is visible when roll is near its end.
   b. See *SECTION 8.5.1, CHANGE PRINTER PAPER ROLL, ON PAGE 8-7*, if a new paper roll is needed.
8. Run required test cycle:
   - Run a Dart® (Bowie-Dick) test at least once a day to document the removal of residual air from sample challenge loads.
   - Run a vacuum leak test at least once each week to measure the integrity of the pressure vessel and associated piping. This test helps assure that air is not being admitted to the sterilizer chamber during vacuum draw downs.

   ***NOTE:** Always run a warm-up cycle before running the daily Dart (Bowie-Dick) test or weekly vacuum leak test.*

   Press MORE CYCLES to access the Vacuum Leak Test and Dart (Bowie-Dick) cycle selector touch-screen pads. For instructions on running these tests refer to cycle descriptions later in this section. Refer also to *SECTION 4, TECHNIQUES OF STERILIZATION*.
9. Once these tests have been run (if necessary), proceed to loading the sterilizer and running cycles.

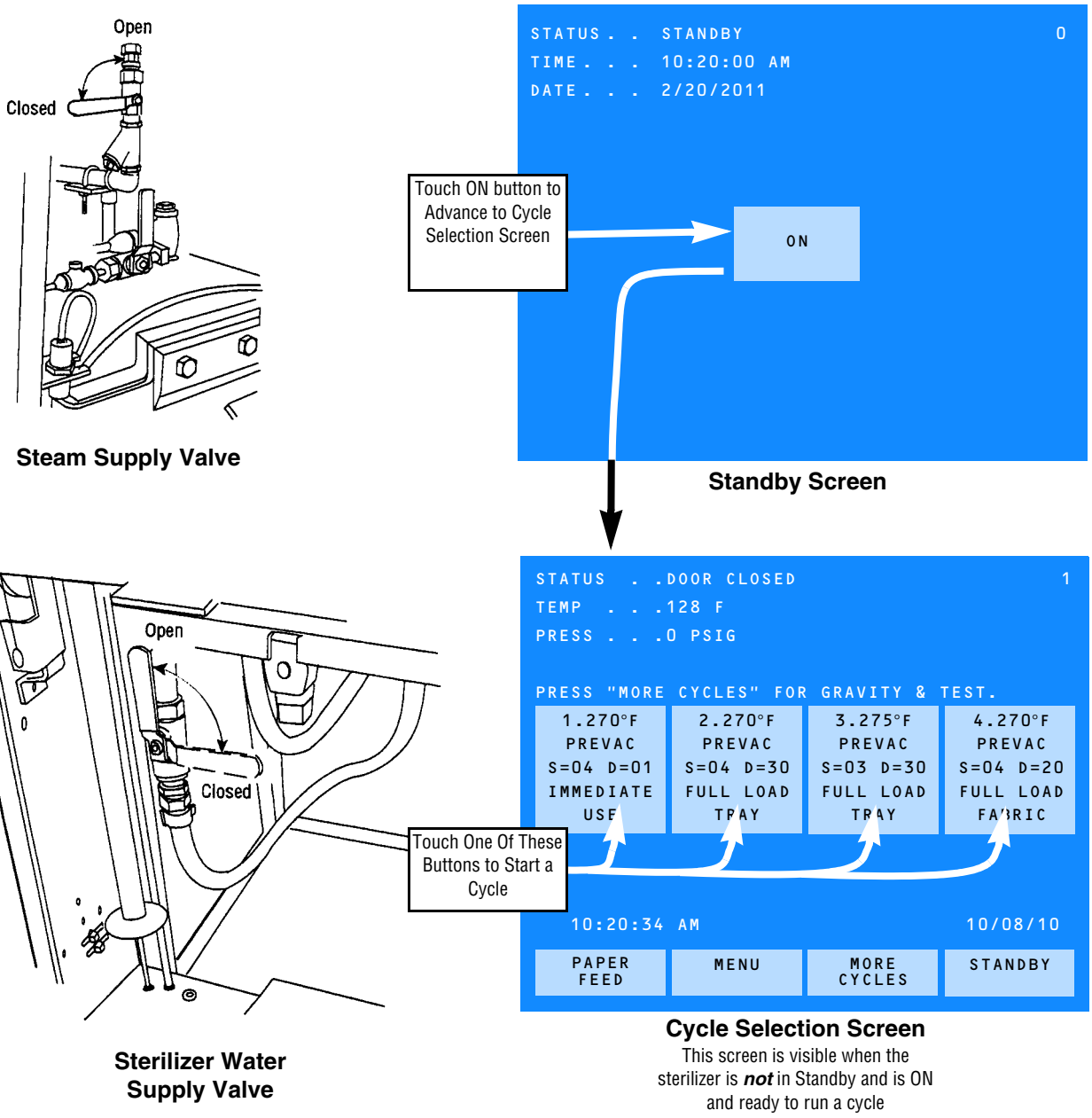

Open
Closed
Steam Supply Valve
STATUS . . STANDBY 0
TIME . . . 10:20:00 AM
DATE . . . 2/20/2011
Touch ON button to Advance to Cycle Selection Screen
ON
Standby Screen
Open
Closed
Sterilizer Water Supply Valve
STATUS . .DOOR CLOSED 1
TEMP . . .128 F
PRESS . . .0 PSIG
PRESS "MORE CYCLES" FOR GRAVITY & TEST.
1.270°F PREVAC S=04 D=01 IMMEDIATE USE
2.270°F PREVAC S=04 D=30 FULL LOAD TRAY
3.275°F PREVAC S=03 D=30 FULL LOAD TRAY
4.270°F PREVAC S=04 D=20 FULL LOAD FABRIC
Touch One Of These Buttons to Start a Cycle
10:20:34 AM 10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
Cycle Selection Screen
This screen is visible when the sterilizer is not in Standby and is ON and ready to run a cycle

Figure 6-1. Utility Supply Valves and Basic Sterilizer Controls

6.2 Preparing Loads for Sterilization Cycles

Before sterilization, all materials must be thoroughly cleaned.

The AMSCO® C Series Small Steam Sterilizer chamber holds commonly used wrapped or unwrapped instruments and equipment.

1. Wrappers may be made of 100% cotton, 140 thread count, two-ply fabric, and must be laundered; alternatively, use commercially available, non-woven disposable wrappers.
2. Limit the weight of each pack to approximately 3.3 lb (1.5 kg), and density to 11.3 lb/ft^3 (181 kg/m^3). This ensures complete steam penetration, and minimizes moisture retention.
3. Limit the weight of wrapped instrument sets to 25 lb (11 kg) to minimize moisture retention.

6.3 Guidelines for Placement of Various Loads

Refer to AAMI ST-79 for load placement guidelines.

1. Open the sterilizer chamber door.

   NOTE: *If a cycle has been run, sterilizer and shelves or loading car may be hot.*

   NOTE: *Wear clean gloves and use clean towels as "pot holders" when carefully placing the load/tray(s) on the chamber shelves or loading car.*

WARNING – BURN HAZARD: Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.

2. Place all packs on edge, and arrange load to allow for maximum steam exposure so there is minimal resistance for steam passage through the load.
3. Place utensils and treatment trays on their edges so they will be sterilized and properly dried.
4. Place instrument sets in trays that have a perforated or mesh bottom. Place flat for sterilization.

   In mixed loads of fabrics and hard goods, place the hard goods on lower shelf. This reduces wetting of fabric packs from condensate dripping from a hard goods load.

   DO NOT OVERLOAD STERILIZER. Allow for steam penetration between packs. Avoid contact of load components with the wall of the chamber.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of any obstructions.

5. After placing load in chamber, close the chamber door. The sterilizer is now ready to run a cycle. Proceed to appropriate cycle description in this section.

   Materials capable of holding water, such as solid-bottomed pans, basins and trays, should be positioned so they are oriented in the same direction and so condensate can be eliminated.

Important: Refer to *SECTION 4, TECHNIQUES OF STERILIZATION,* for additional information regarding pack preparation, loading and placement.

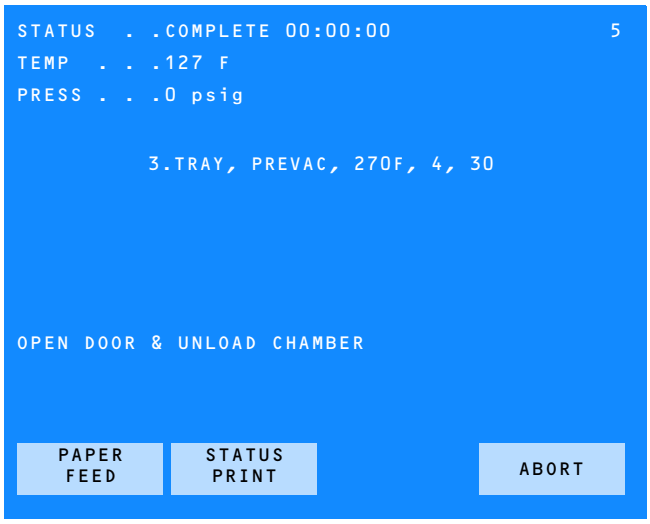
6.4 Unloading the Sterilizer

WARNING – BURN HAZARD:

- **Sterilizer and shelves will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – SLIPPING HAZARD: To prevent falls, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

At the end of a cycle, when end-of-cycle tone sounds and display shows the complete display (see below), open the chamber door.



NOTE: *Wear clean gloves and use clean towels as "pot holders" when carefully removing load/tray(s) from the sterilizer shelves or loading car.*

NOTE: *Never place a sterilized tray on a solid shelf or cold surface. Once the tray has cooled, it can be placed on a wire shelf.*

1. Remove the load from chamber shelf (shelves). Avoid unnecessary handling.
2. Visually check outside wrapper for dryness. If there are water droplets or visible moisture on the exterior of the package, or on the tape used to secure it, the pack or instrument tray is considered **unacceptable.**
3. To prevent condensation, transfer the load to a surface which is well-padded with fabric. **Do not place load on a cold surface.** Be sure that no air conditioning or cold air vents are in close proximity.
4. Remove packs or instrument trays from the padded surface when they have reached ambient (room) temperature. Depending on the items and environment of the area, this may take a minimum of one hour.

Important: After removing load(s) from the chamber, close the chamber door and keep the chamber door closed to minimize utility consumption.

6.5 Loading Car Instructions: Loading

NOTE: The loading car and transfer carriage are for use with the 20-inch AMSCO C Series Small Steam Sterilizer, only.

1. Open sterilizer door.
2. Verify that loading car is securely fastened to the transfer carriage.
3. Align the front end of the transfer carriage with the end of the sterilizer. (See Figure 6-2).
4. Move carriage forward until latches engage with mating holes in chamber end frame.
5. Verify that transfer carriage is securely latched by pulling transfer carriage backward (transfer carriage should remain stationary).
6. Once transfer carriage is securely latched, release the loading car from the transfer carriage by lifting the carriage lock.
7. Carefully push the loading car off the transfer carriage and fully into the sterilizer chamber.
8. Disengage transfer carriage latches from end frame by pushing carriage latch knob.
9. Back the transfer carriage away from the sterilizer.
10. Close the chamber door.

    The sterilizer is now ready to run a cycle. Proceed to appropriate cycle description found in *SECTION 6, STERILIZER OPERATION.*

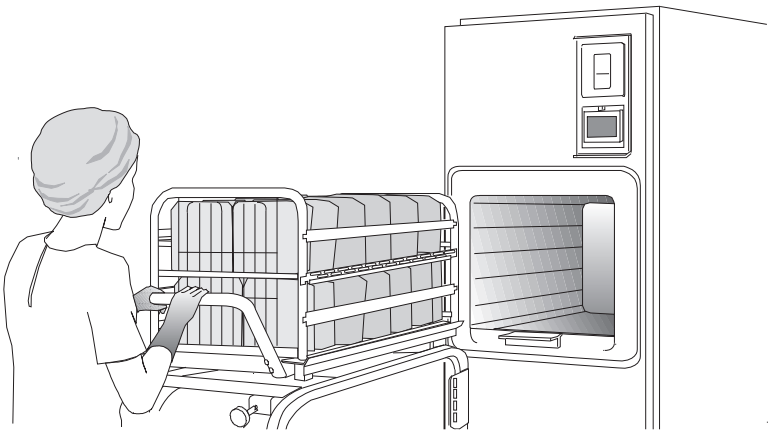


Figure 6-2. Align Loading Car with Chamber Opening

6.6 Loading Car Instructions: Unloading

WARNING – BURN HAZARD: Sterilizer, rack/shelves and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.

WARNING – BURN HAZARD: Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

NOTE: The loading car and transfer carriage are for use with the 20-inch AMSCO C Series Small Steam Sterilizer, only.

1. Open sterilizer door.
2. Move transfer carriage forward until latches engage with track inside chamber.
3. Verify that transfer carriage latched to track inside chamber by pulling transfer carriage backward (transfer carriage should remain stationary).
4. Once transfer carriage is latched to track inside chamber, grasp the loading car and carefully pull loading car from chamber onto transfer carriage until transfer carriage latch engages to loading car.
5. Disengage transfer carriage latches from track inside chamber by pushing carriage latch knob.
6. Close the sterilizer door.
7. Transfer load from sterilizer area.

6.7 Loading/Unloading Sterilizer: Rack and Shelves

WARNING – BURN HAZARD: Sterilizer, rack/shelves and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.

If sterilizer is equipped with the rack and shelves option, refer to instructions below and Figure 6-3.

1. Open chamber door.
2. Transfer load to shelves in chamber. Shelves slide out halfway to facilitate loading.
3. After loading the shelves, slide them to closed position to verify shelf does not interfere with door operation (both doors if double-door sterilizer).
4. Close chamber door(s).
5. The sterilizer is now ready to run a cycle. Refer to appropriate cycle description in *SECTION 6, STERILIZER OPERATION* (later in this section of the manual).

6. Following successful completion of the sterilization cycle, unload the sterilizer as follows:
   a. Open chamber door.
   b. Remove load from chamber.
   c. Slide shelves into chamber, verifying that position does not interfere with door operation.
   d. Close chamber door.
   e. Transfer load to destination.

WARNING – BURN HAZARD: Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.

WARNING – SLIPPING HAZARD: To prevent falls keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

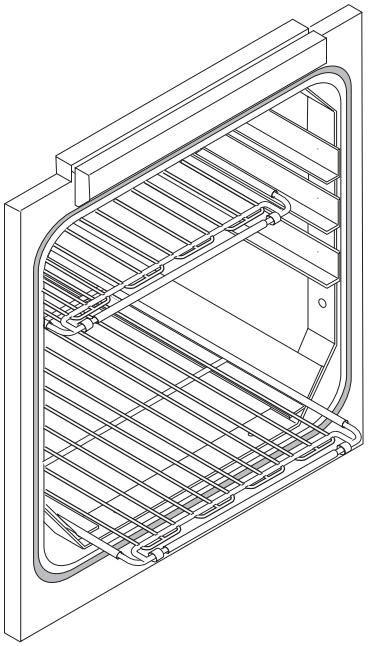


Figure 6-3. Sterilizer Chamber Equipped with Rack and Shelves

6.8 Prevacuum Sterilizer Cycles

AMSCO C Series Small Steam Prevacuum Sterilizers are shipped with the factory-set cycles. Cycle descriptions are given in *SECTION 6.9,* through *SECTION 6.14.* Refer to **Table 1** (page ii) for factory set, qualified cycle settings.

Important: Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

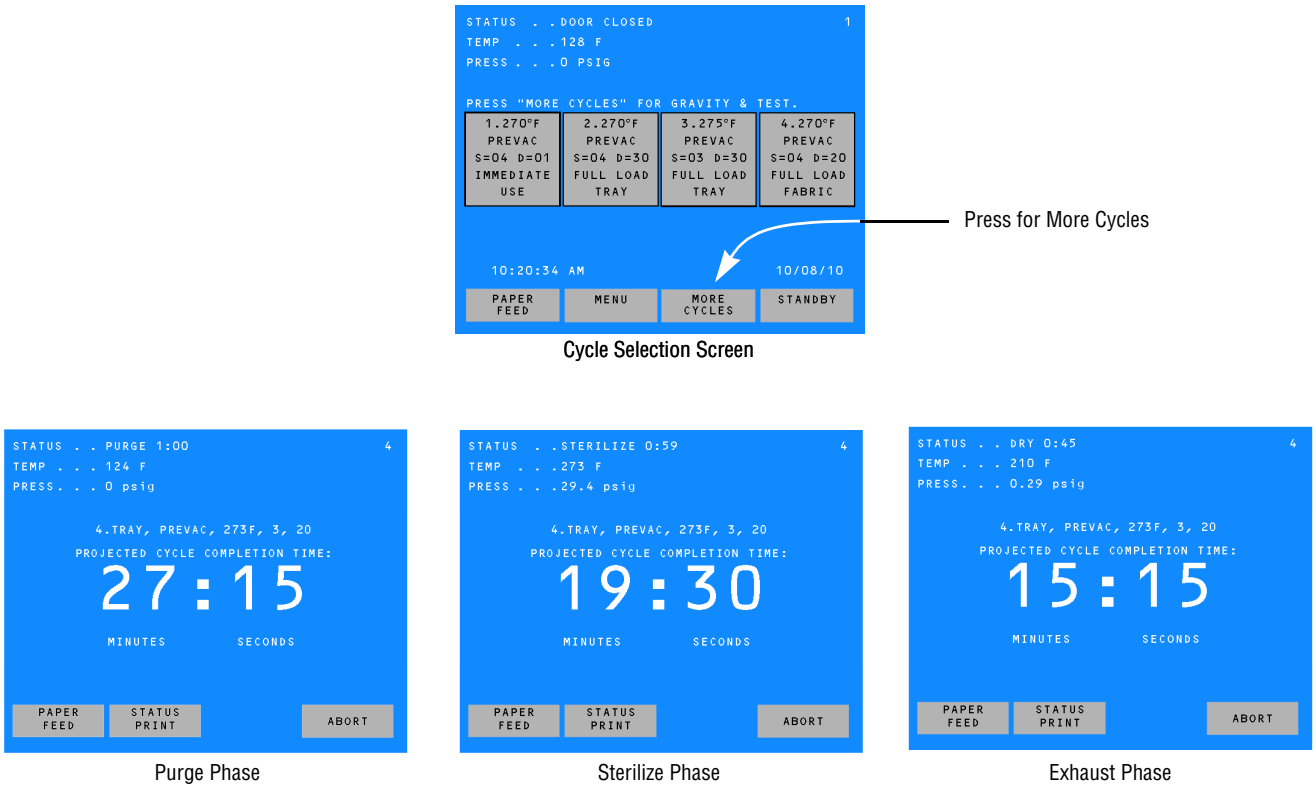
NOTE: *Contact STERIS Corporation for information on a wide range of education/training programs designed to meet the educational needs of healthcare industries.*

Table 6-1. Factory-Set Prevacuum Cycles and Cycle Values

The AMSCO C Series *Prevacuum* Small Steam Sterilizer is equipped with the following factory programmed prevacuum sterilization cycles and cycle values.

Cycles	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load	Validation Standard
Prevac Cycle	270°F (132°C)	4 Minutes	20 Minutes*	Fabric Packs	ST-8:2008
Prevac Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads; maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
Prevac Cycle	275°F (135°C)	3 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads; maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008
Immediate Use Prevac Cycle	270°F (132°C)	4 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument, or multiple unwrapped instrument trays, porous and non-porous loads; maximum weight per tray: 25 lb (11.3 kg)	ST-8:2008

* *Dry time can be reduced to 5 minutes for a single fabric pack.*



NOTE: *Countdown time on display is estimated; timer self-corrects estimated time at beginning of each phase.*

Figure 6-4. Prevac Cycle In-Cycle Screens

6.9 Prevac Cycles

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves and loading equipment will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – SLIPPING HAZARD: To reduce slippery conditions, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

WARNING – PERSONAL INJURY and/or EQUIPMENT DAMAGE HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

Prevac cycles, 270°F (132°C), are used for sterilizing double-wrapped instrument trays or fabric packs. Prevac cycles, 275°F (135°C), are used for sterilizing double-wrapped instrument trays only. Immediate use cycles must not be used with wrapped loads or fabrics.

1. Before running this cycle refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1*.
2. See instructions for using the loading car/transfer carriage or rack and shelves, earlier in this section, for procedures to load the sterilizer.
   - For 270°F (132°C) Cycle, press 270 PREVAC button to start the prevacuum cycle. Refer to **Table 6-1** for descriptions of cycle use and loading recommendations.
   - For 275°F (135°C) Cycle press 275 PREVAC touch-screen pad to start the 275°F (135°C) Prevacuum cycle. Refer to **Table 6-1** for descriptions of cycle use and loading recommendations.

   ***NOTE:** If the wrong cycle has been selected, see SECTION 6.15, ABORTING CYCLES, ON PAGE 6-30.*
3. Sterilizer automatically progresses through cycle, as follows:

   ***NOTE:** The control display indicates cycle progress in two ways:*

   a. Large numerals in the screen's center display estimated remaining cycle time,

   b. Change of phase name in the top status line of the screen.

   ACTIVATE SEAL – Steam enters the door seal, pressing it against inside surface of the door.

   PURGE – Chamber is purged with steam. Start of Condition is printed.

   VACUUM/PRESSURE PULSES – Differing by temperature rating for the cycle:

   - 270°F (132°C) #1 - #4 – Four vacuum pulses.
   - 275°F (135°C) #1 – #3 – Three vacuum pulses.

   CHARGE – Chamber is charged with steam. Start of steam charge is printed.

   STERILIZE – Start of sterilize exposure is printed when the chamber reaches sterilization temperature. Chamber temperature is printed every minute.

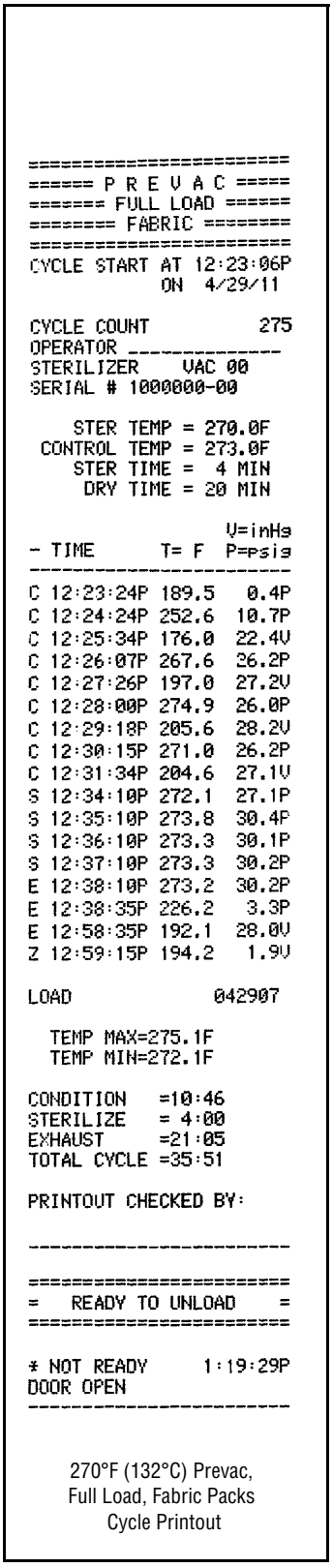
   FAST EXHAUST – Start of exhaust is printed and chamber is exhausted to 4 psig (0.28 bar).

   DRY – Start of dry is printed and display counts down dry time remaining.

   AIR BREAK – Chamber is returned to atmospheric pressure.

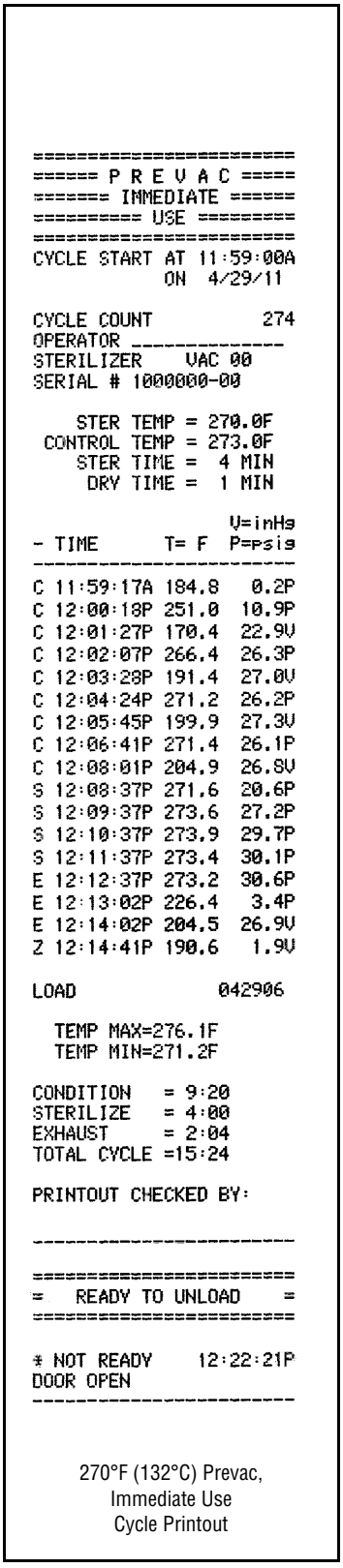
   RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

   COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.
4. Unload sterilizer (see instructions for using the loading car/transfer carriage or rack and shelves, *SECTION 6.4, UNLOADING THE STERILIZER, ON PAGE 6-4* for procedures to remove load).



```
========================
====== P R E V A C =====
======= FULL LOAD ======
======== FABRIC ========
========================
CYCLE START AT 12:23:06P
           ON  4/29/11

CYCLE COUNT          275
OPERATOR _____________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME =  4 MIN
     DRY TIME = 20 MIN

                   V=inHg
- TIME      T= F  P=psig
------------------------
C 12:23:24P 189.5   0.4P
C 12:24:24P 252.6  10.7P
C 12:25:34P 176.0  22.4V
C 12:26:07P 267.6  26.2P
C 12:27:26P 197.0  27.2V
C 12:28:00P 274.9  26.0P
C 12:29:18P 205.6  28.2V
C 12:30:15P 271.0  26.2P
C 12:31:34P 204.6  27.1V
S 12:34:10P 272.1  27.1P
S 12:35:10P 273.8  30.4P
S 12:36:10P 273.3  30.1P
S 12:37:10P 273.3  30.2P
E 12:38:10P 273.2  30.2P
E 12:38:35P 226.2   3.3P
E 12:58:35P 192.1  28.0V
Z 12:59:15P 194.2   1.9V

LOAD             042907

  TEMP MAX=275.1F
  TEMP MIN=272.1F

CONDITION   =10:46
STERILIZE   = 4:00
EXHAUST     =21:05
TOTAL CYCLE =35:51

PRINTOUT CHECKED BY:

________________________

========================
=   READY TO UNLOAD    =
========================

* NOT READY     1:19:29P
DOOR OPEN
------------------------
```

270°F (132°C) Prevac,
Full Load, Fabric Packs
Cycle Printout



```
========================
====== P R E V A C =====
======= IMMEDIATE ======
========== USE =========
========================
CYCLE START AT 11:59:00A
           ON  4/29/11

CYCLE COUNT          274
OPERATOR _____________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME =  4 MIN
     DRY TIME =  1 MIN

                   V=inHg
- TIME      T= F  P=psig
------------------------
C 11:59:17A 184.8   0.2P
C 12:00:18P 251.0  10.9P
C 12:01:27P 170.4  22.9V
C 12:02:07P 266.4  26.3P
C 12:03:28P 191.4  27.0V
C 12:04:24P 271.2  26.2P
C 12:05:45P 199.9  27.3V
C 12:06:41P 271.4  26.1P
C 12:08:01P 204.9  26.8V
S 12:08:37P 271.6  20.6P
S 12:09:37P 273.6  27.2P
S 12:10:37P 273.9  29.7P
S 12:11:37P 273.4  30.1P
E 12:12:37P 273.2  30.6P
E 12:13:02P 226.4   3.4P
E 12:14:02P 204.5  26.9V
Z 12:14:41P 190.6   1.9V

LOAD             042906

  TEMP MAX=276.1F
  TEMP MIN=271.2F

CONDITION   = 9:20
STERILIZE   = 4:00
EXHAUST     = 2:04
TOTAL CYCLE =15:24

PRINTOUT CHECKED BY:

________________________

========================
=   READY TO UNLOAD    =
========================

* NOT READY    12:22:21P
DOOR OPEN
------------------------
```

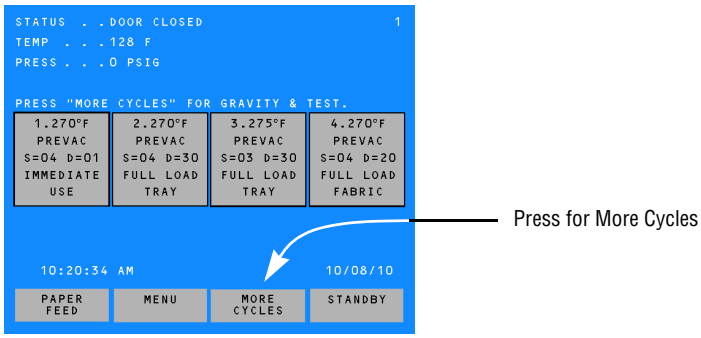
270°F (132°C) Prevac,
Immediate Use
Cycle Printout

Figure 6-5. Typical Prevacuum Cycle Printouts

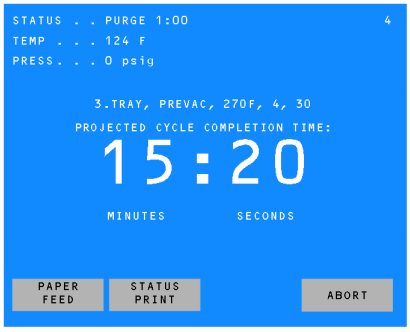
Table 6-2. Factory-Set Gravity Cycles and Cycle Values

The AMSCO C Series *Prevacuum* Sterilizer is equipped with the following factory programmed gravity sterilization cycles and cycle values.

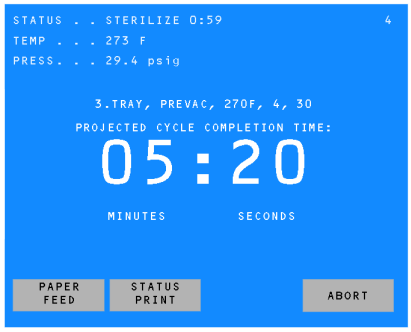
Cycles	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load	Validation Standard
Immediate Use Gravity Cycle	270°F (132°C)	3 Minutes	1 Minute	Unwrapped instrument tray containing a single instrument; or multiple unwrapped instrument trays, non-porous load; maximum weight per tray: 25 lb (11.3 kg).	ST-8:2008
Immediate Use Gravity Cycle	270°F (132°C)	10 Minutes	1 Minute		ST-8:2008


STATUS . . DOOR CLOSED
TEMP . . . 128 F
PRESS . . . 0 PSIG
PRESS "MORE CYCLES" FOR GRAVITY & TEST.
1.270°F PREVAC S=04 D=01 IMMEDIATE USE
2.270°F PREVAC S=04 D=30 FULL LOAD TRAY
3.275°F PREVAC S=03 D=30 FULL LOAD TRAY
4.270°F PREVAC S=04 D=20 FULL LOAD FABRIC
10:20:34 AM
10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
Press for More Cycles

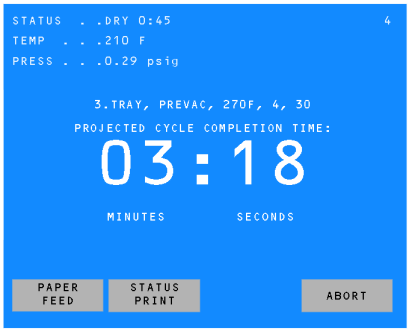
Cycle Selection Screen



Purge Phase

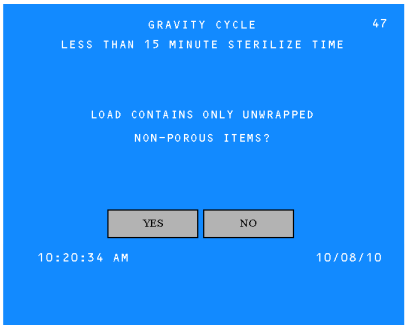


Sterilize Phase

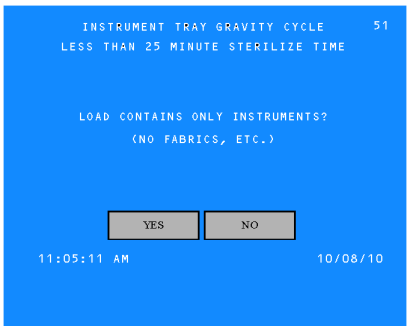


Exhaust Phase

NOTE: *Countdown time on display is estimated; timer self-corrects estimated time at beginning of each phase.*



Confirmation Screen for Less-Than-25-Minute Gravity Cycle



Confirmation Screen for Less-Than-15-Minute Gravity Cycle

Figure 6-6. Gravity Cycle In-Cycle Screens

6.10 Gravity Cycles

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves and loading equipment will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – SLIPPING HAZARD: To reduce slippery conditions, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

The Gravity cycle is used for sterilizing one or more unwrapped instrument trays containing non-porous items.

1. Refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1* before running this cycle.
2. See instructions for using the loading car/transfer carriage or rack and shelves, earlier in this section, for procedures to load the sterilizer.
3. To start the Gravity cycle, press the appropriate GRAVITY touch-screen pad. Refer to **Table 6-2** for descriptions of cycle use.
4. Confirmation screen #47 or #51 appears on the control (see facing page). Verify correct load is in the chamber to match sterilize exposure time for selected cycle and press YES or NO to continue.

   NOTE: *If the wrong cycle has been selected, see SECTION 6.15, ABORTING CYCLES, ON PAGE 6-30.*
5. Sterilizer automatically progresses through cycle, as follows:

   NOTE: *The control display indicates cycle progress in two ways:*

   a. Large numerals in the screen's center display estimated remaining cycle time,

   b. Change of phase name in the top status line of the screen.

   ACTIVATE SEAL – Steam enters the door seal, pressing it against inside surface of the door.

   PURGE – Chamber is purged with steam. Start of condition is printed.

   CHARGE – Chamber is charged with steam. Start of steam charge is printed.

   STERILIZE – Start of sterilize exposure is printed when the chamber reaches sterilization temperature. Chamber temperature is printed every minute.

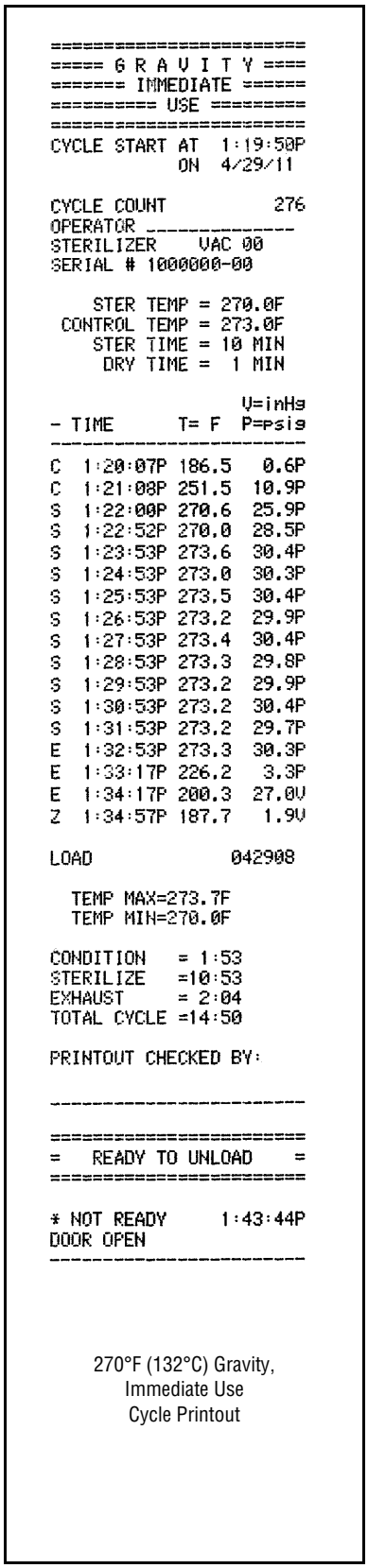
   FAST EXHAUST – Start of exhaust is printed and chamber is exhausted to 4 psig.

   DRY – Start of dry is printed and display counts down dry time remaining.

   AIR BREAK – Chamber is returned to atmospheric pressure.

   RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

   COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.
6. Unload sterilizer (see instructions for using the loading car/ transfer carriage or rack and shelves, earlier in this section for procedures to remove load).



```
========================
===== G R A V I T Y ====
======= IMMEDIATE ======
========== USE =========
========================
CYCLE START AT  1:19:50P
            ON  4/29/11

CYCLE COUNT           276
OPERATOR _______________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME = 10 MIN
     DRY TIME =  1 MIN

                     V=inHg
- TIME      T= F  P=psig
------------------------
C  1:20:07P 186.5   0.6P
C  1:21:08P 251.5  10.9P
S  1:22:00P 270.6  25.9P
S  1:22:52P 270.0  28.5P
S  1:23:53P 273.6  30.4P
S  1:24:53P 273.0  30.3P
S  1:25:53P 273.5  30.4P
S  1:26:53P 273.2  29.9P
S  1:27:53P 273.4  30.4P
S  1:28:53P 273.3  29.8P
S  1:29:53P 273.2  29.9P
S  1:30:53P 273.2  30.4P
S  1:31:53P 273.2  29.7P
E  1:32:53P 273.3  30.3P
E  1:33:17P 226.2   3.3P
E  1:34:17P 200.3  27.0V
Z  1:34:57P 187.7   1.9V

LOAD             042908

  TEMP MAX=273.7F
  TEMP MIN=270.0F

CONDITION   = 1:53
STERILIZE   =10:53
EXHAUST     = 2:04
TOTAL CYCLE =14:50

PRINTOUT CHECKED BY:

------------------------

========================
=   READY TO UNLOAD    =
========================

* NOT READY     1:43:44P
DOOR OPEN
------------------------
```

270°F (132°C) Gravity,
Immediate Use
Cycle Printout

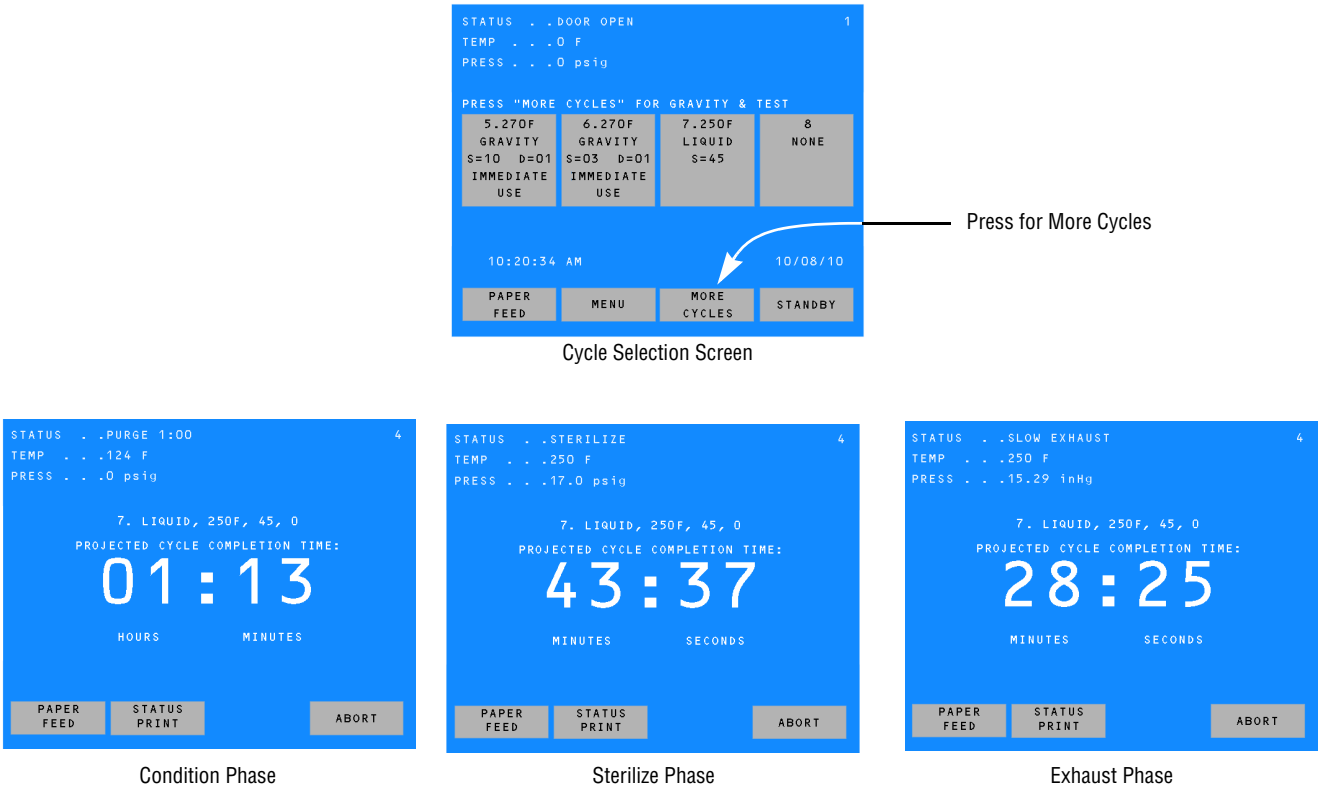
Figure 6-7. Typical Gravity Cycle Printout

Table 6-3. Factory-Set Optional Liquid Cycle and Cycle Values

The AMSCO C Series Sterilizer is equipped with the following optional factory programmed liquid sterilization cycle and cycle values.

Cycles	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load (by Chamber Size)	Validation Standard
Liquid*	250°F (121°C)	45 Min.	N/A	**16 x 16"** – 15 x 1,000 mL Flasks **20 x 20"** with Loading Car – 32 x 1,000 mL Flasks with Rack and Shelves – 28 x 1,000 mL Flasks	ST-8: 2008

* *The liquid cycle is for non-patient contact use only.*



NOTE: *Countdown time on display is estimated; timer self-corrects estimated time at beginning of each phase.*

Figure 6-8. Liquid Cycle In-Cycle Screens

6.11 Liquid Cycle

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: Avoid personal injury from bursting bottles. Liquid sterilization cycle must only be used for liquids in borosilicate (Pyrex) flasks with vented closures.

WARNING: The liquid cycle is for non-patient contact use only.

WARNING – BURN HAZARD: When sterilizing liquids, you must observe the following procedures:

- **Use Liquid cycle only.**
- **Use only vented closures.**
- **Use only Type I borosilicate glass bottles.**
- **Do not allow hot bottle to be jolted.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD: Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.

This cycle is used for sterilizing liquids in vented closures.

1. Refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1* before running this cycle.
2. See instructions for using the loading car/transfer carriage or rack and shelves, earlier in this section, for procedures to load the sterilizer.
3. Press LIQUID touch-screen pad to start the Liquid cycle. Refer to **Table 6-3** for descriptions of cycle use.

   ***NOTE:** If the wrong cycle has been selected, see SECTION 6.15, ABORTING CYCLES, ON PAGE 6-30 in this section.*
4. Sterilizer automatically progresses through cycle, as follows:

   ***NOTE:** The control display indicates cycle progress in two ways:*

   a. Large numerals in the screen's center display estimated remaining cycle time,

   b. Change of phase name in the top status line of the screen.

   ACTIVATE SEAL – Steam enters the door seal, pressing it against inside surface of the door.

   PURGE – Chamber is purged with steam. Start of condition is printed.Countdown timer on the display is estimated; timer self-corrects estimated time at the beginning of each phase.

   CHARGE – Chamber is charged with steam. Start of steam charge is printed.

   STERILIZE – Start of sterilize exposure is printed when the chamber reaches sterilization temperature. Chamber temperature is printed every five minutes.

   SLOW EXHAUST – Start of exhaust is printed and chamber is exhausted to 0 psig.

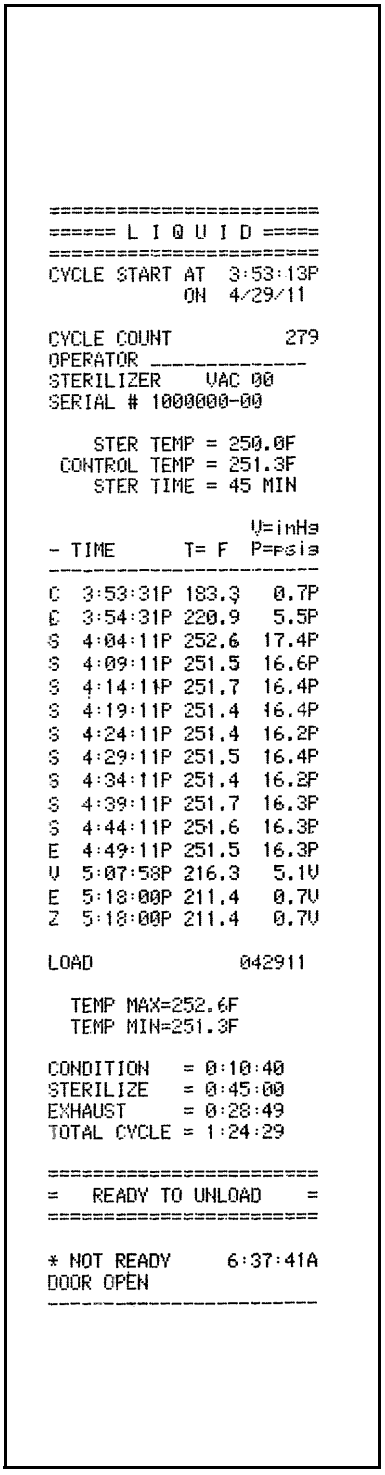
   SLOW EVACUATE – A vacuum is slowly drawn in the chamber to 5.0 inHg. This phase assures that the chamber is cooled to 208°F/95°C.

   VAPOR REMOVAL – Filtered air enters the chamber at the same time a vacuum is drawn to cool the load. Chamber pressure is maintained between 1 and 5 inHg. Phase continues for 10 minutes.

   AIR BREAK – Chamber is returned to atmospheric pressure.

   RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

   COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.
5. Unload sterilizer (see instructions for using the loading car/ transfer carriage or rack and shelves, earlier in this section for procedures to remove load).



```
========================
====== L I Q U I D =====
========================
CYCLE START AT  3:53:13P
            ON  4/29/11

CYCLE COUNT          279
OPERATOR _______________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 250.0F
 CONTROL TEMP = 251.3F
    STER TIME = 45 MIN

                     V=inHg
- TIME      T= F  P=psig
------------------------
C  3:53:31P 183.3   0.7P
E  3:54:31P 220.9   5.5P
S  4:04:11P 252.6  17.4P
S  4:09:11P 251.5  16.6P
S  4:14:11P 251.7  16.4P
S  4:19:11P 251.4  16.4P
S  4:24:11P 251.4  16.2P
S  4:29:11P 251.5  16.4P
S  4:34:11P 251.4  16.2P
S  4:39:11P 251.7  16.3P
S  4:44:11P 251.6  16.3P
E  4:49:11P 251.5  16.3P
V  5:07:58P 216.3   5.1V
E  5:18:00P 211.4   0.7V
Z  5:18:00P 211.4   0.7V

LOAD             042911

  TEMP MAX=252.6F
  TEMP MIN=251.3F

CONDITION   = 0:10:40
STERILIZE   = 0:45:00
EXHAUST     = 0:28:49
TOTAL CYCLE = 1:24:29

========================
=   READY TO UNLOAD    =
========================

* NOT READY     6:37:41A
DOOR OPEN
------------------------
```

Figure 6-9. Typical Printout of a Liquid Cycle

6.12 SFPP Sterilizer Cycles

AMSCO C Series SFPP Steam Sterilizers are shipped with factory-set cycles. The cycle sequence for these cycles is given in *SECTION 6.13* (prevac and gravity cycles are described in *SECTION 6.9*, *SECTION 6.10* and *SECTION 6.11*). Refer below, and to **Table 2** (page iii) for factory-set, qualified cycle settings.

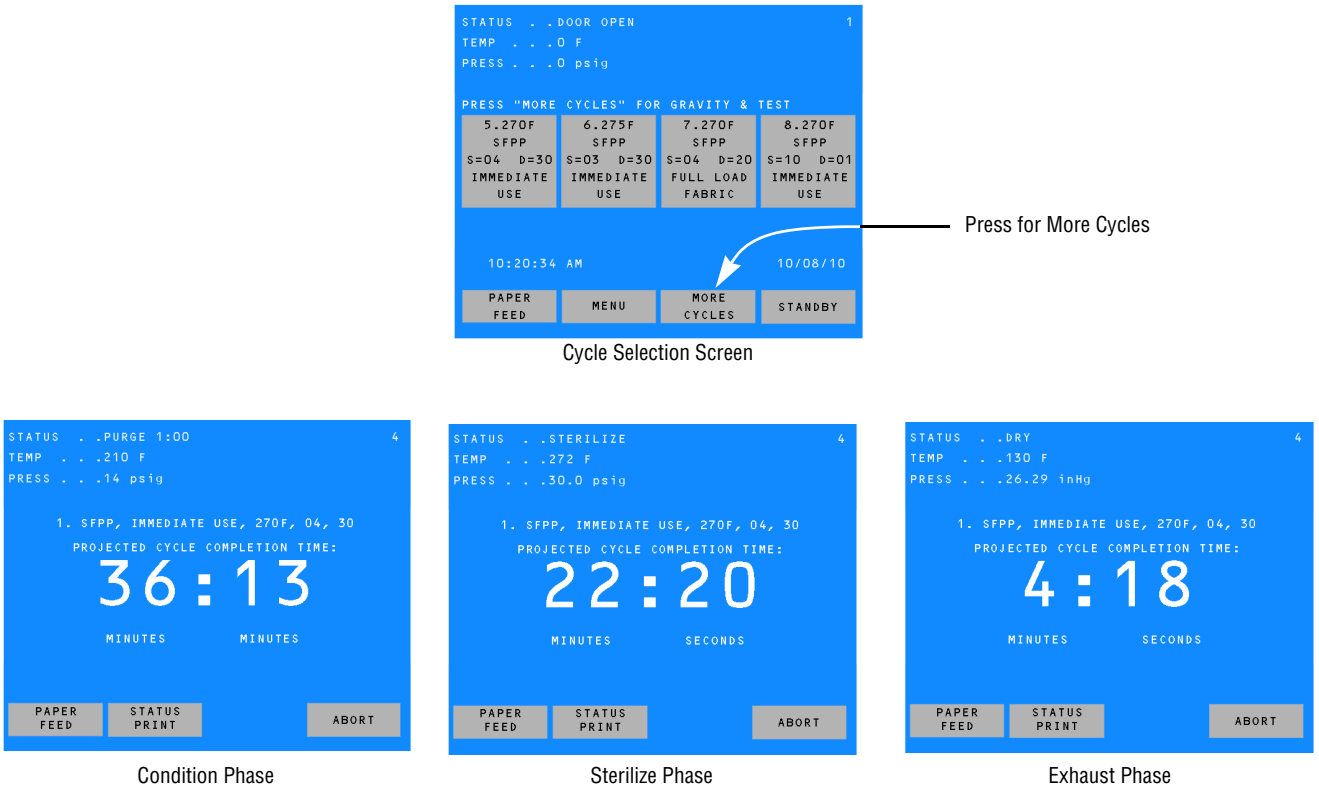
Important: Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

NOTE: *Contact your customer service representative for information on a wide range of education/training programs designed to meet the educational needs of healthcare industries.*

Table 6-4. Factory-Set *SFPP* Sterilizer Cycles and Cycle Values

Cycles	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load	Validation Standard
SFPP Cycle	270°F (132°C)	4 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008
SFPP Cycle	270°F (132°C)	4 Minutes	20 Minutes*	Fabric Packs	ST-8:2008
SFPP Cycle	275°F (135°C)	3 Minutes	30 Minutes	Double-wrapped instrument trays, porous and non-porous loads. Maximum weight per tray, 25 lb (11.3 kg)	ST-8:2008

* *Dry time can be reduced to 5 minutes for a single fabric pack.*



***NOTE:** Countdown time on display is estimated; timer self-corrects estimated time at beginning of each phase.*

Figure 6-10. SFPP Cycle In-Cycle Screens

6.13 SFPP Cycles

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – SLIPPING HAZARD: To reduce slippery conditions, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

SFPP cycles are designed for sterilizing both fabric packs and instrument trays. The cycle conditions loads at above-atmospheric pressure.

***NOTE:** NOTE: Make sure items are clean and free of soil.*

1. Refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1* before running this cycle.
2. See instructions for using the loading car/transfer carriage or rack and shelves, earlier in this section, for procedures to load the sterilizer.
3. Press the SFPP touch-screen pad to start the SFPP cycle. Refer to **Table 6-4** for descriptions of cycle use.

   ***NOTE:** If the wrong cycle has been selected, see SECTION 6.15, ABORTING CYCLES, ON PAGE 6-30.*

   ***NOTE:** The control display indicates cycle progress in two ways:*

   a. Large numerals in the screen's center display estimated remaining cycle time,

   b. Change of phase name in the top status line of the screen.
4. Sterilizer automatically progresses through cycle, as follows:

   ACTIVATE SEAL – Steam enters the door seal, pressing it against inside surface of door.

   PURGE – Chamber is purged with steam. Start of condition is printed.

   STEAM FLUSH – (SFPP) PULSE #1 through PULSE #3 – Pressure point is printed and pressure pulse is repeated.

   CHARGE – Chamber is charged with steam. Start of steam charge is printed.

   STERILIZE – Start of sterilize exposure is printed when the chamber reaches sterilization temperature. Chamber temperature is printed every minute.

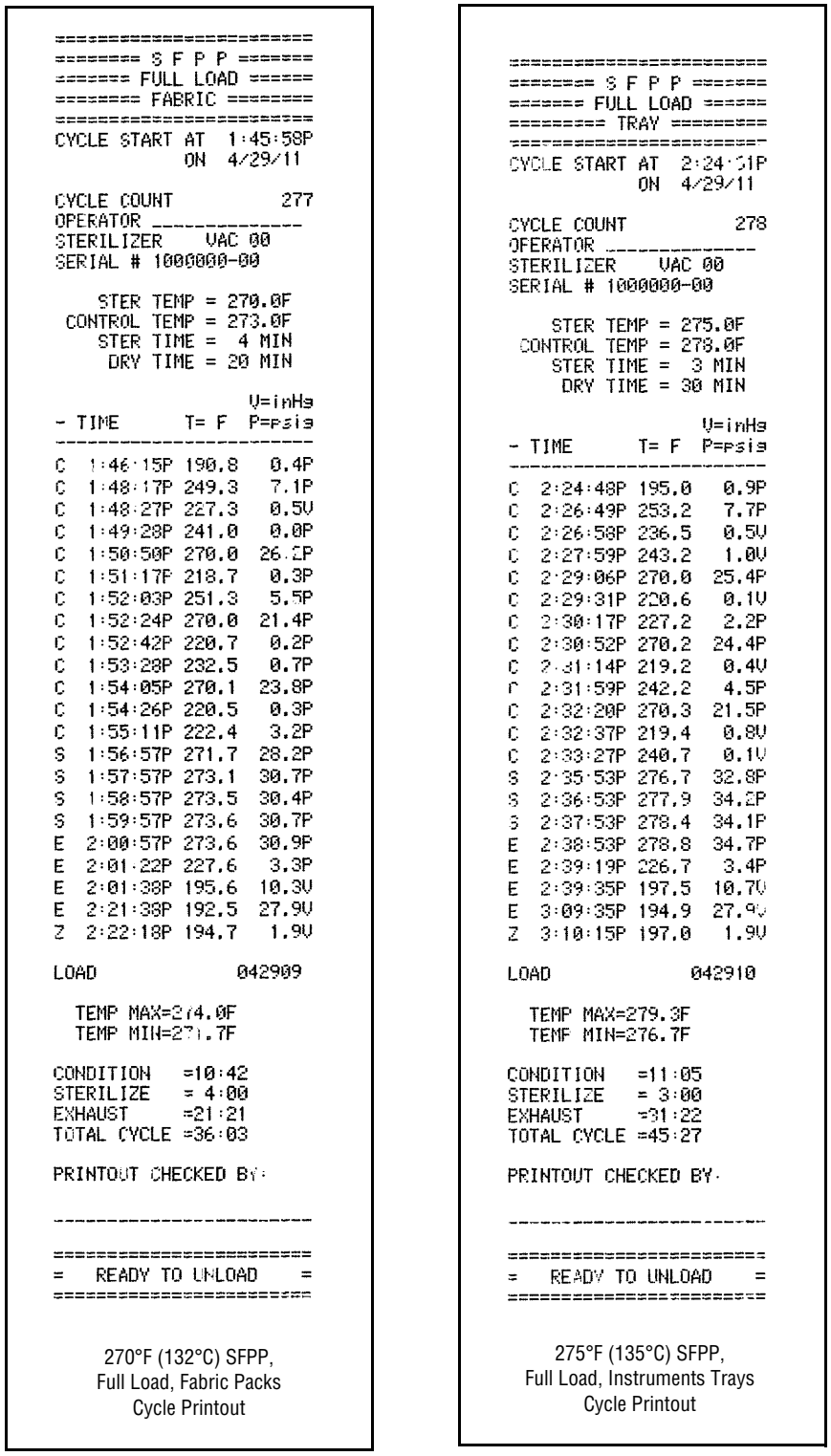
   FAST EXHAUST – Start of exhaust is printed and chamber is exhausted to 4 psig.

   DRY – Start of dry is printed and display counts down dry time remaining.

   AIR BREAK – Chamber is returned to atmospheric pressure.

   RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

   COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.
5. Unload sterilizer (see instructions for using the loading car/ transfer carriage or rack and shelves, earlier in this section, for procedures to remove load).



```
========================
======== S F P P =======
======= FULL LOAD ======
======== FABRIC ========
========================
CYCLE START AT  1:45:58P
           ON  4/29/11

CYCLE COUNT          277
OPERATOR _______________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME =  4 MIN
     DRY TIME = 20 MIN

                    V=inHg
- TIME      T= F  P=psig
------------------------
C  1:46:15P 190.8   0.4P
C  1:48:17P 249.3   7.1P
C  1:48:27P 227.3   0.5V
C  1:49:28P 241.0   0.0P
C  1:50:50P 270.0  26.2P
C  1:51:17P 218.7   0.3P
C  1:52:03P 251.3   5.5P
C  1:52:24P 270.0  21.4P
C  1:52:42P 220.7   0.2P
C  1:53:28P 232.5   0.7P
C  1:54:05P 270.1  23.8P
C  1:54:26P 220.5   0.3P
C  1:55:11P 222.4   3.2P
S  1:56:57P 271.7  28.2P
S  1:57:57P 273.1  30.7P
S  1:58:57P 273.5  30.4P
S  1:59:57P 273.6  30.7P
E  2:00:57P 273.6  30.9P
E  2:01:22P 227.6   3.3P
E  2:01:38P 195.6  10.3V
E  2:21:38P 192.5  27.9V
Z  2:22:18P 194.7   1.9V

LOAD             042909

  TEMP MAX=274.0F
  TEMP MIN=271.7F

CONDITION   =10:42
STERILIZE   = 4:00
EXHAUST     =21:21
TOTAL CYCLE =36:03

PRINTOUT CHECKED BY:

------------------------

========================
=   READY TO UNLOAD    =
========================
```

270°F (132°C) SFPP,
Full Load, Fabric Packs
Cycle Printout

```
========================
======== S F P P =======
======= FULL LOAD ======
========= TRAY =========
========================
CYCLE START AT  2:24:31P
           ON  4/29/11

CYCLE COUNT          278
OPERATOR _______________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 275.0F
 CONTROL TEMP = 278.0F
    STER TIME =  3 MIN
     DRY TIME = 30 MIN

                    V=inHg
- TIME      T= F  P=psig
------------------------
C  2:24:48P 195.0   0.9P
C  2:26:49P 253.2   7.7P
C  2:26:58P 236.5   0.5V
C  2:27:59P 243.2   1.0V
C  2:29:06P 270.0  25.4P
C  2:29:31P 220.6   0.1V
C  2:30:17P 227.2   2.2P
C  2:30:52P 270.2  24.4P
C  2:31:14P 219.2   0.4V
C  2:31:59P 242.2   4.5P
C  2:32:20P 270.3  21.5P
C  2:32:37P 219.4   0.8V
C  2:33:27P 240.7   0.1V
S  2:35:53P 276.7  32.8P
S  2:36:53P 277.9  34.2P
S  2:37:53P 278.4  34.1P
E  2:38:53P 278.8  34.7P
E  2:39:19P 226.7   3.4P
E  2:39:35P 197.5  10.7V
E  3:09:35P 194.9  27.9V
Z  3:10:15P 197.0   1.9V

LOAD             042910

  TEMP MAX=279.3F
  TEMP MIN=276.7F

CONDITION   =11:05
STERILIZE   = 3:00
EXHAUST     =31:22
TOTAL CYCLE =45:27

PRINTOUT CHECKED BY:

------------------------

========================
=   READY TO UNLOAD    =
========================
```

275°F (135°C) SFPP,
Full Load, Instruments Trays
Cycle Printout

Figure 6-11. Typical Printouts – 270°F SFPP and 275° SFPP Cycles

6.14 Test Cycles

Test cycles are factory programmed on prevacuum sterilizers. These cycles are used to verify the sterilizer is functioning at optimum capability.

Table 6-5. Test Cycles

Test Cycles for All Units	Sterilize Temp.	Sterilize Time	Dry Time	Recommended Load	Validation Standard
Dart Warm-up*	270°F (132°C)	3 Minutes	1 Minute	N/A	N/A
Dart (Bowie-Dick) Test*	270°F (132°C)	3-1/2 Minutes	1 Minute	Dart or Bowie-Dick Test Pack	ST-8: 2008
Leak Test*	N/A	N/A	N/A	N/A	ST-8: 2008

* *Not adjustable.*

ACCESSING TEST CYCLES

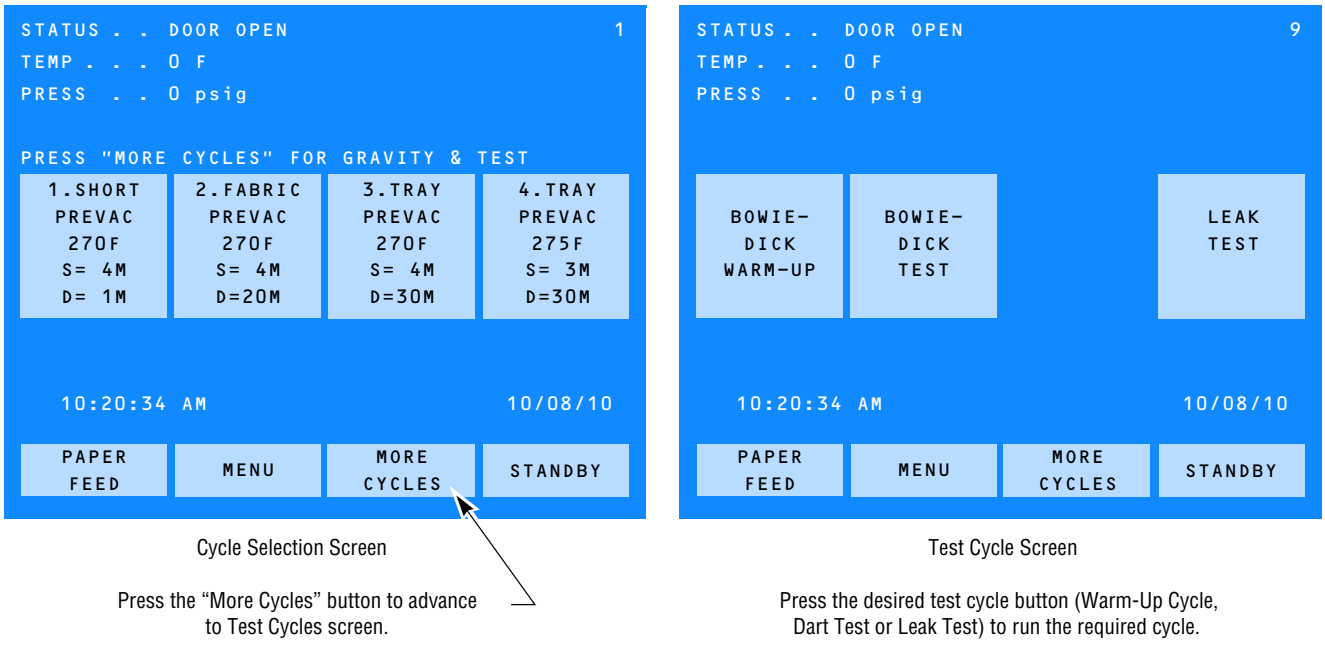

STATUS . . DOOR OPEN 1
TEMP . . . 0 F
PRESS . . 0 psig
PRESS "MORE CYCLES" FOR GRAVITY & TEST
1.SHORT PREVAC 270F S= 4M D= 1M
2.FABRIC PREVAC 270F S= 4M D=20M
3.TRAY PREVAC 270F S= 4M D=30M
4.TRAY PREVAC 275F S= 3M D=30M
10:20:34 AM
10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
Cycle Selection Screen
Press the "More Cycles" button to advance to Test Cycles screen.
STATUS . . DOOR OPEN 9
TEMP . . . 0 F
PRESS . . 0 psig
BOWIE-DICK WARM-UP
BOWIE-DICK TEST
LEAK TEST
10:20:34 AM
10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
Test Cycle Screen
Press the desired test cycle button (Warm-Up Cycle, Dart Test or Leak Test) to run the required cycle.

Figure 6-12. Test Cycles Start-Cycle Screens

6.14.1 Dart (Bowie-Dick) Test

This cycle is used to conduct a Dart (Bowie-Dick) test on sterilizers that use prevacuum cycles. This test is only applicable to sterilizers that use prevacuum cycles. For SFPP sterilizers, if the SFPP cycle is used exclusively, there is no need to run a daily Dart (Bowie-Dick) test. *If prevacuum cycles will also be run on the same sterilizer, then a daily Dart (Bowie-Dick) test must be run.*

The Dart (Bowie-Dick) test is designed to document the removal of residual air from a sample challenge load (see Section 4.2.2, Testing for Prevacuum Efficiency, on page 4-2). Refer to *SECTION 4, TECHNIQUES OF STERILIZATION*, when constructing the Bowie-Dick test pack.

ANSI/AAMI ST-79 requires a Dart test cycle be run as the first cycle each day the sterilizer is in use. The chamber must be at operating temperature when the Dart test cycle is performed. The Warm-up cycle should be completed prior to performing the Dart test cycle.

***NOTE:** Always run this test cycle with either racks installed, or with an empty cart in the chamber.*

1. Refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1*, and to Section 4, Techniques of Sterilization, to prepare the unit for running this cycle.
2. Press the MORE CYCLES button to access the test cycle screen.
3. A Dart test should only be run in a machine that is at operating temperature (that is, has run one or more cycles). If the sterilizer has not run any cycles prior to the Dart (Bowie-Dick) test, run the Warm-up cycle as follows. If the chamber has already been warmed by previous cycle operation, proceed to **Step 4.**
   a. The operator is prompted to close the chamber door, if it is open. Once closed, the door seals automatically.
   b. During “warm up,” the sterilizer automatically runs a cycle with 3-minute sterilize and 1-minute dry values.
   c. Once the Warm-up cycle is complete, the display returns to Test Cycles screen.
4. Open the chamber door (if it is not already open). Load the Dart (Bowie-Dick) test pack and close the door.

   ***NOTE:** For most accurate results, test pack should be located low in the chamber, over the drain.*
5. Start the Dart test cycle. The cycle runs automatically, as follows:

   ACTIVATE SEAL – Steam enters the door seal, pressing seal against inside surface of door.

   VACUUM/PRESSURE PULSES – #1 - #4 – Vacuum pulses (drawing from 2 - 24 inHg) are followed by pressure pulses (0.2 - 15 psig).

   CHARGE – Chamber is charged with steam. Start of steam charge is printed.

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves and loading equipment will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – PERSONAL INJURY and/or EQUIPMENT DAMAGE HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves and loading equipment will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

STERILIZE – Start of sterilize exposure is printed when the chamber reaches set temperature. Chamber temperature is printed every minute. Chamber is controlled at set point plus overdrive.

FAST EXHAUST – Start of exhaust is printed and chamber is exhausted to 4 psig (0.28 bar).

DRY – Start of dry is printed and display counts down dry time remaining.

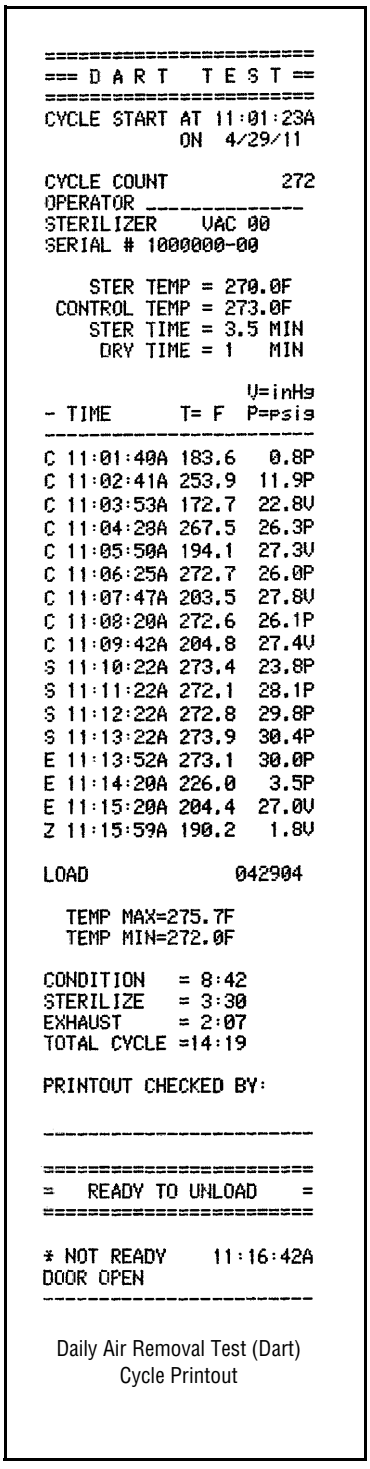
AIR BREAK – Chamber is returned to atmospheric pressure.

RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.

6. Once the cycle is complete:
   a. Open the chamber door.
   b. Unload the Dart (Bowie-Dick) test pack.
   c. Forward the exposed Dart (Bowie-Dick) indicator to the appropriate personnel for examination.

Important: Any indication of a malfunction must be reported to the supervisor. Sterilizer must not be used again until approved by supervisor. The cause of the malfunction must be determined and resolved prior to operating the sterilizer.



```
========================
=== D A R T   T E S T ==
========================
CYCLE START AT 11:01:23A
          ON  4/29/11

CYCLE COUNT          272
OPERATOR _____________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME = 3.5 MIN
     DRY TIME = 1   MIN

                    V=inHg
- TIME      T= F  P=psig
------------------------
C 11:01:40A 183.6   0.8P
C 11:02:41A 253.9  11.9P
C 11:03:53A 172.7  22.8V
C 11:04:28A 267.5  26.3P
C 11:05:50A 194.1  27.3V
C 11:06:25A 272.7  26.0P
C 11:07:47A 203.5  27.8V
C 11:08:20A 272.6  26.1P
C 11:09:42A 204.8  27.4V
S 11:10:22A 273.4  23.8P
S 11:11:22A 272.1  28.1P
S 11:12:22A 272.8  29.8P
S 11:13:22A 273.9  30.4P
E 11:13:52A 273.1  30.0P
E 11:14:20A 226.0   3.5P
E 11:15:20A 204.4  27.0V
Z 11:15:59A 190.2   1.8V

LOAD             042904

  TEMP MAX=275.7F
  TEMP MIN=272.0F

CONDITION   = 8:42
STERILIZE   = 3:30
EXHAUST     = 2:07
TOTAL CYCLE =14:19

PRINTOUT CHECKED BY:

________________________

========================
=   READY TO UNLOAD    =
========================

* NOT READY    11:16:42A
DOOR OPEN
------------------------
```

Daily Air Removal Test (Dart)
Cycle Printout

Figure 6-13. Dart (Bowie-Dick) Test Cycle Printout

6.14.2 Vacuum Leak Test

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

WARNING – STERILITY ASSURANCE HAZARD: According to AAMI standards, a measured leak rate greater than 1 mm Hg/minute (1.3 mbar/min) indicates a problem with the sterilizer. Refer the situation to a qualified service technician before using the sterilizer further.

This cycle is used for testing vacuum integrity of the sterilizer and piping.

A Vacuum Leak Test cycle should be run on the sterilizer at least once each week. It should be one of the first cycles run for the day, but not the first cycle. In this cycle, the sterilizer automatically checks for vacuum leaks in the piping and door seal. If the sterilizer fails the leak test, it must be inspected by a qualified service technician. (This test is not a substitute for a Dart [Bowie-Dick] test.) The Leak Test can also be used to confirm that the sterilizer piping is intact after performing repairs.

***NOTE:** The measured leak rate (millimeters of mercury [mm Hg] per minute) is calculated by the control over a timed 10-minute period and is included in the cycle printout. A leak rate of 1 mm Hg/minute or less is considered acceptable.*

1. Before running Leak Test cycle, refer to *SECTION 6.1, BEFORE OPERATING THE STERILIZER, ON PAGE 6-1*.

   ***NOTE:** The sterilizer should be warm before running this test cycle. If no other cycle has been run on the sterilizer before the Leak Test, run a Dart Warm Up cycle.*

2. Press MORE CYCLES. The Leak Test cycle touch-screen pad appears on display.
3. To start the Leak Test, press the LEAK TEST touch-screen pad. Printer records cycle start. Cycle runs automatically as follows:

***NOTE:** Cycle requires 30-35 minutes to complete.*

ACTIVATE SEAL – Steam enters the door seal, pressing seal against inside surface of door.

PURGE – Chamber is purged; printer records end of purge.

PULSE #1 (and PULSE #2) – Two vacuum and pressure pulses then occur and printer records each.

CHARGE – After the pressure pulses, temperature rises to 270°F (132°C), unit begins to draw a vacuum for 10 minutes. (Printer records temperature and pressure at beginning of 10-minute vacuum time.)

LEAK TEST/EVACUATING – Printer records temperature and vacuum at end of evacuation time.

LEAK TEST/STABILIZING – 2 -minute stabilization period begins after 10-minute evacuation is completed.

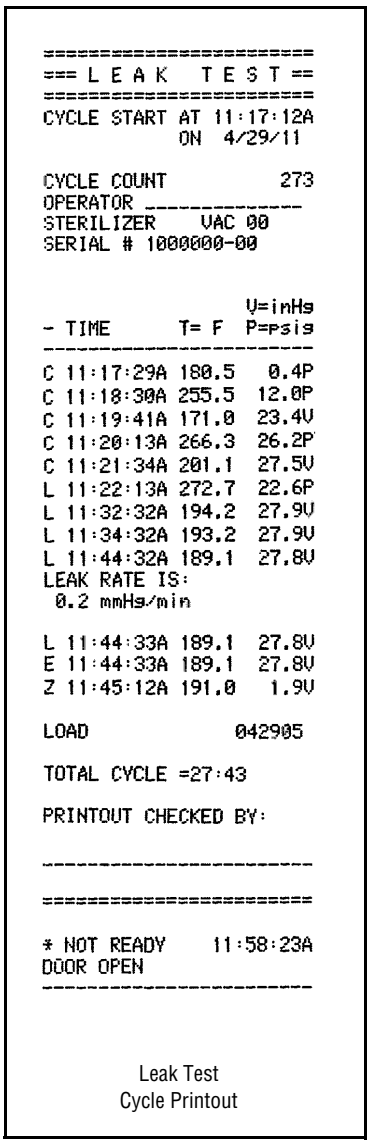
LEAK TEST – Ten minute Leak Test period begins after 2-minute stabilization is completed. Printer records calculated leak rate (mm Hg per minute) after 10-minute leak time.

AIR BREAK – Chamber is returned to atmospheric pressure, complete tone sounds and cycle summary and end of cycle messages are printed.

RETRACT SEAL – A vacuum is drawn on the seal, retracting it from inner surface of door.

COMPLETE – Complete tone sounds. Cycle summary and end of cycle messages are printed.

4. Once the sterilizer completes and passes the leak test, the unit can be used.



```
========================
=== L E A K   T E S T ==
========================
CYCLE START AT 11:17:12A
          ON  4/29/11

CYCLE COUNT          273
OPERATOR _____________
STERILIZER    VAC 00
SERIAL # 1000000-00


                    V=inHg
- TIME      T= F  P=psig
------------------------
C 11:17:29A 180.5   0.4P
C 11:18:30A 255.5  12.0P
C 11:19:41A 171.0  23.4V
C 11:20:13A 266.3  26.2P
C 11:21:34A 201.1  27.5V
L 11:22:13A 272.7  22.6P
L 11:32:32A 194.2  27.9V
L 11:34:32A 193.2  27.9V
L 11:44:32A 189.1  27.8V
LEAK RATE IS:
 0.2 mmHg/min

L 11:44:33A 189.1  27.8V
E 11:44:33A 189.1  27.8V
Z 11:45:12A 191.0   1.9V

LOAD             042905

TOTAL CYCLE =27:43

PRINTOUT CHECKED BY:

------------------------

========================

* NOT READY    11:58:23A
DOOR OPEN
------------------------
```

Leak Test
Cycle Printout

Figure 6-14. Typical Printout of a Leak Test Cycle

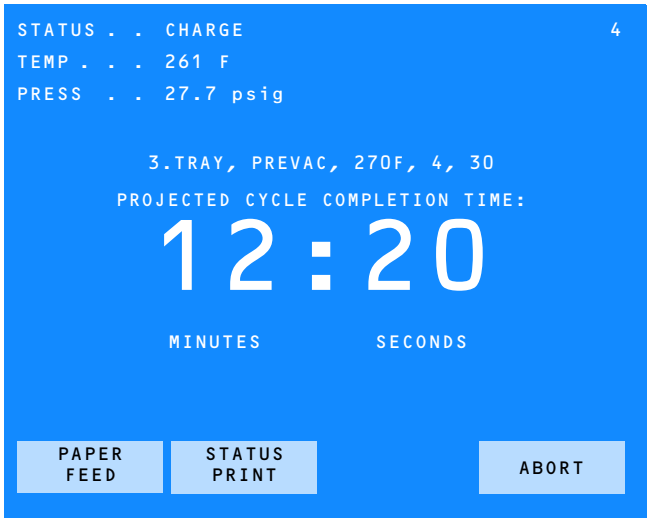
6.15 Aborting Cycles

WARNING – BURN HAZARD:

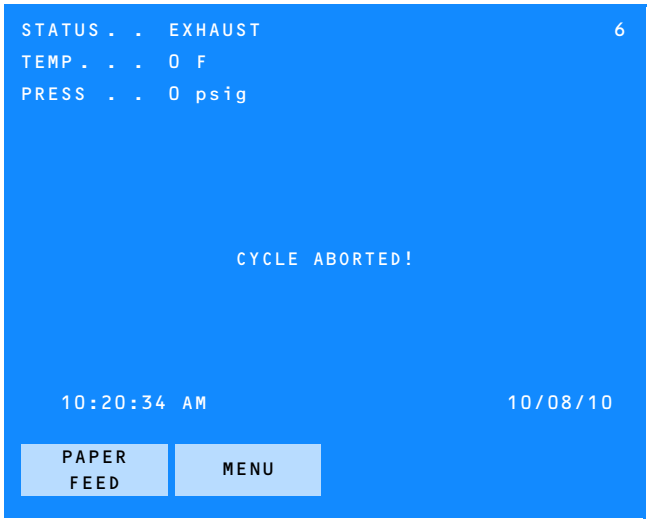
- **Sterilizer, rack/shelves and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous operation.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**

It may be necessary to end a processing cycle, possibly because the wrong cycle was selected or the sterilizer begins functioning incorrectly. A cycle can be aborted at any time by pressing the ABORT touch-screen pad.

1. Touch the ABORT touch-screen pad.



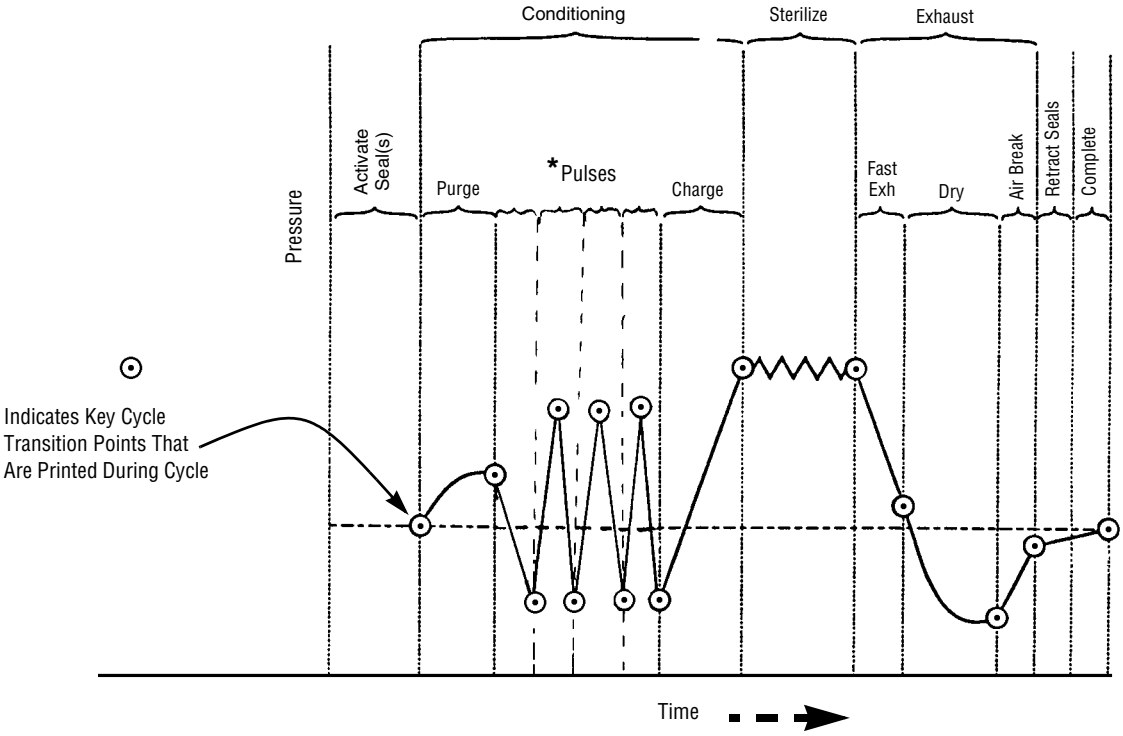
- The status line on the display changes to EXHAUSTING CHAMBER, if there is pressure in the chamber.
- The sterilizer exhausts the chamber of steam.



2. Once chamber reaches 4 psig, the sterilizer removes vapor from the chamber for one minute.
3. Once vapor removal is over, status line changes to COMPLETE. When complete the sterilizer chamber can be unloaded following the instructions earlier in this section of the manual.

6.16 Cycle Graphs

These cycle graphs provide a visual representation of AMSCO C Series Small Steam Sterilizer cycles and their phases.



** **NOTE:** 270°F (132°C) prevac cycle runs four conditioning vacuum pulses. 275°F (135°C) prevac runs three conditioning vacuum pulses.*

Figure 6-15. Cycle Graph – 270°F or 275°F Prevacuum and Dart (Bowie-Dick) Cycles

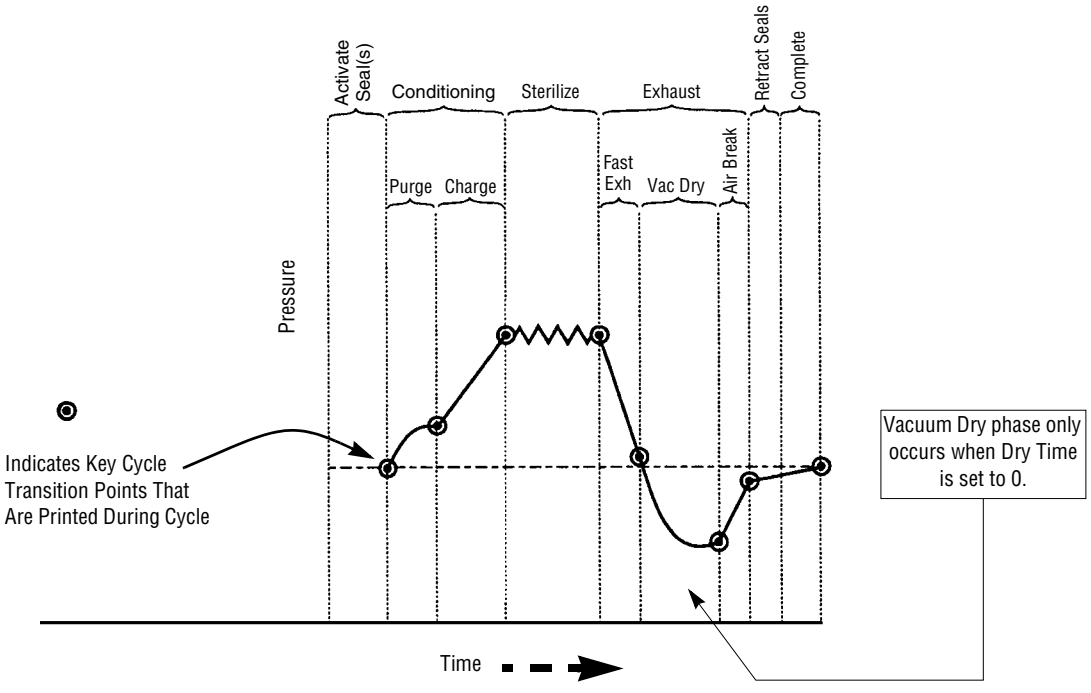


Figure 6-16. Cycle Graph – Gravity Cycle

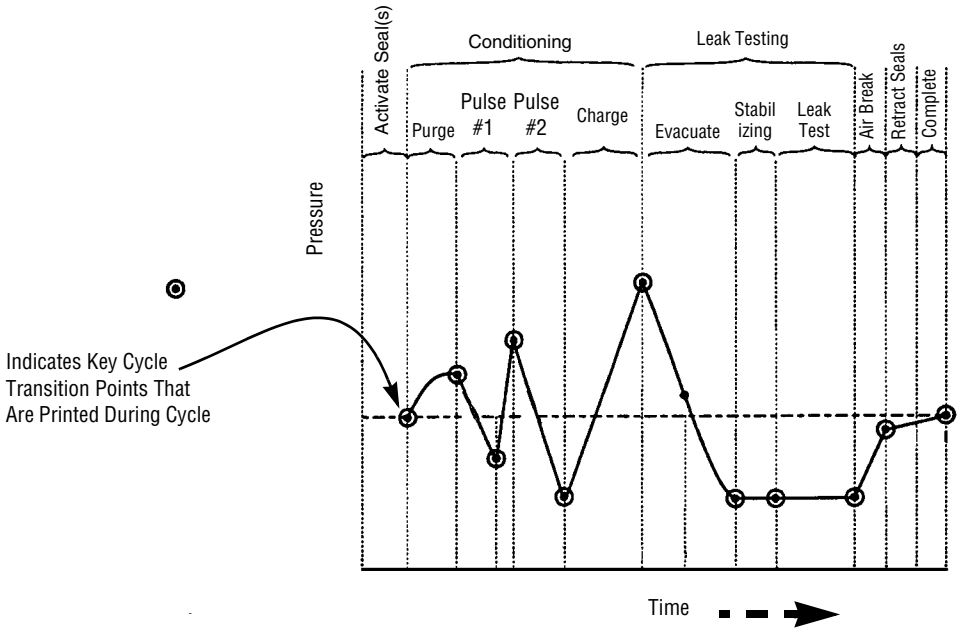


Figure 6-17. Cycle Graph – Leak Test

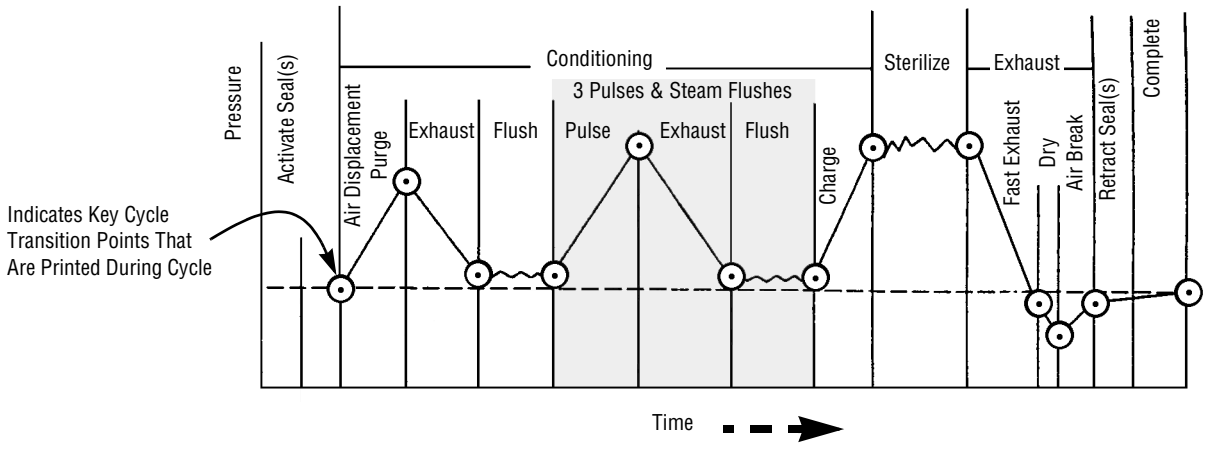


Figure 6-18. Cycle Graph – Steam Flush Pressure Pulse (SFPP) Cycles

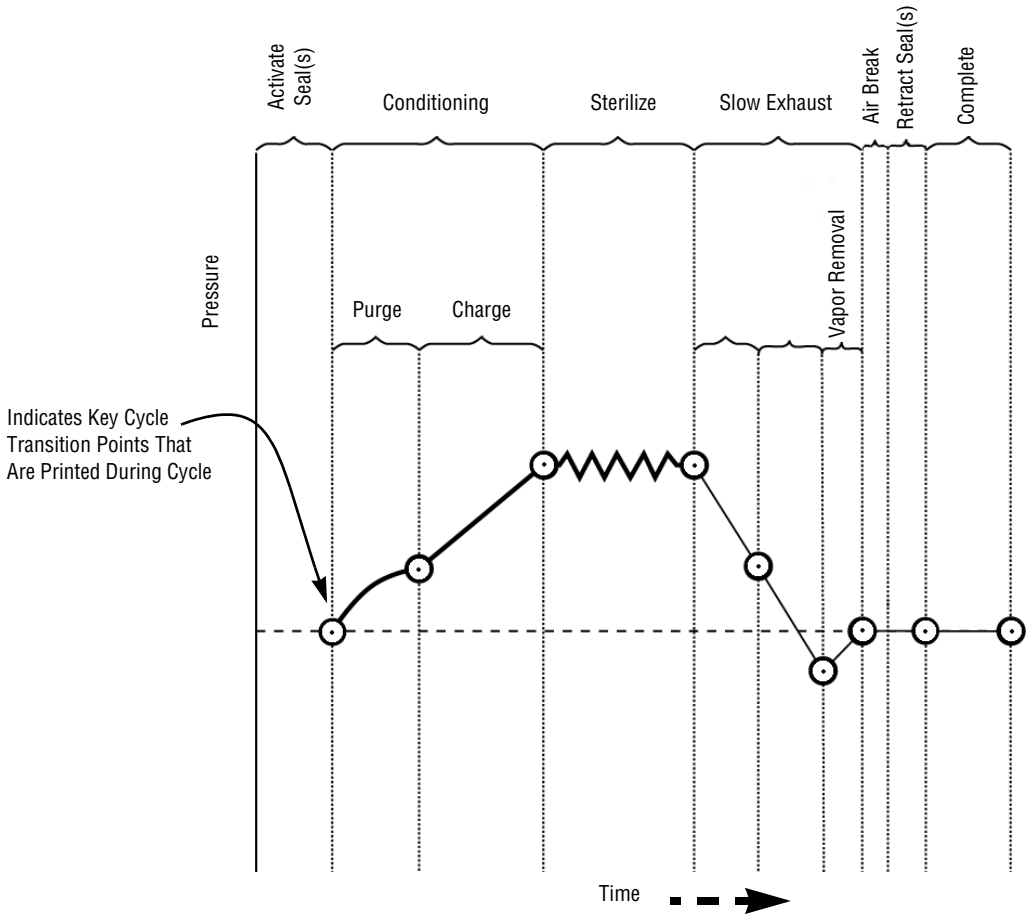


Figure 6-19. Cycle Graph – Liquid Cycle

CYCLE AND CONTROL VALUE PROGRAMMING 7

AMSCO® C Series Small Steam Sterilizers are shipped with factory-set cycles, cycle values and control values programmed into the control (see **Table 1**, **Table 2** and **Table 3**; page ii, iii and iii). Preset values can be changed to tailor the sterilizer to the operating environment in which it has been placed. To change these values, refer to *Section 7.2, Change Cycle Values, on page 7-2*.

NOTE: *If a battery/memory failure should occur, operator-set cycles and values would be lost.*

Important: Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

NOTE: *Although AMSCO C Series Small Steam Sterilizers are factory-set to operate using Fahrenheit temperature units, the sterilizer can be reprogrammed to display and print using Celsius temperature units.*

7.1 Change Values

IMPORTANT

Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

The Change Values procedure described in the following pages can be used to adjust cycle values within a limited range and to make selections affecting operation of the unit. Refer to **Table 1**, **Table 2** and **Table 3** for tested cycle values.

NOTE: *Default cycle values are shown on* **Table 1**, **Table 2** and **Table 3** *(page ii and iii).*

The Change Values Procedure can be used to adjust the following values:

- Name: The user can select between 3 to 4 factory-programmed names (depending on sterilizer configuration), and can create up to two user-defined cycle names.
- Sterilization Exposure Temperature: Exposure temperatures can be adjusted, but within limits. Refer to **Table 7-1** for details.
- Sterilization Exposure Time: (**Important:** This value is limited to a minimum value, refer to *Section 7.4, Change Time and Date, on page 7-8*). Refer to **Table 7-1** for range limits.
- Dry Time: Refer to **Table 7-1** for range limits.

NOTE: *Change Values can also be used to make adjustments to the Change Machine Setup values shown on* ***Table 7-2****.*

The Change Values touch screens are accessed by pressing the Change Values touchpad (see Screen #2). All Change Values options can be secured (or locked out) using a supervisor's access code. It is recommended that supervisor's Access Code be used to prevent unauthorized personnel from changing cycle and system setup parameters.

NOTE: *Although AMSCO C Series Small Steam Sterilizers are factory-set to operate using Fahrenheit temperature units, the sterilizer can be reprogrammed to display and print using Celsius temperature units.*

7.2 Change Cycle Values

Refer to Figures 7-1 through 7-3.

7.2.1 Overview

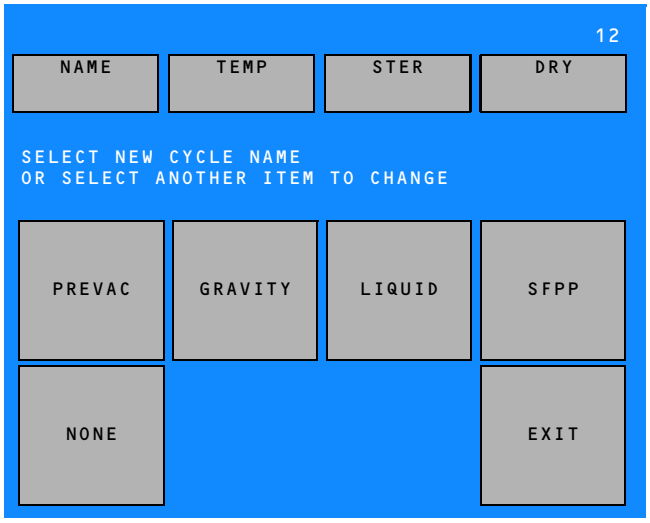
1. Press the **ON** touch screen pad, if the sterilizer is in STANDBY. The control advances to Status screen #1.
2. At screen #1, press the **MENU** touch screen pad, and the control advances to screen #2; access the cycle values by pressing **CHANGE CYCLE VALUES**.
3. Pressing **CHANGE CYCLE VALUES** advances the control to screen #10, prompting the operator to select a cycle to change.
4. Press one of the displayed cycles, or **MORE CYCLES** to find a cycle not currently on the display. Once the cycle has been found and selected, the control advances to screen #11, showing basic cycle information.
5. Select the value to change: **NAME** (name of the cycle), **TEMP** (sterilize exposure temperature), **STER** (sterilize exposure time), or **DRY** (drying phase time). Screen #11 can also be used to enter up to two **CUSTOM** cycles names.
6. Press the touch screen touchpad; the display advances to a screen for making these changes.
7. Once all selections have been made, press the **EXIT** touch screen pad.

7.2.2 Adjusting Cycle Sterilize Time and Dry Time

The following selections can be adjusted:

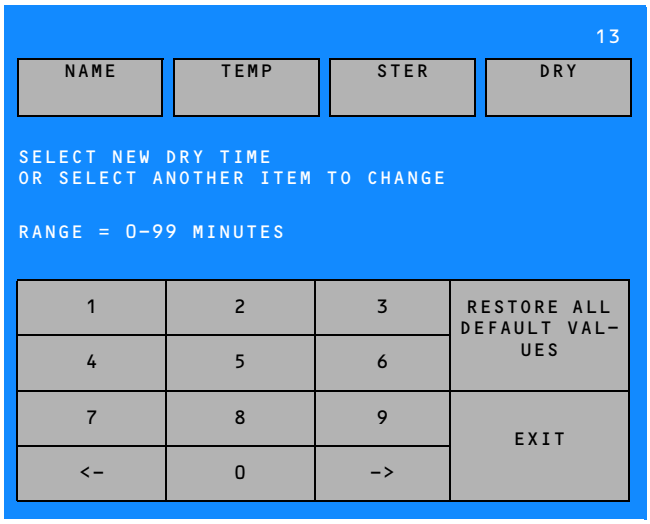
- **NAME:** For changing the cycle type.
  - Prevacuum Configuration – `PREVAC, GRAVITY` or `LIQUID`.
  - SFPP Configuration – `PREVAC, GRAVITY, SFPP` or `LIQUID`.
  - `CUSTOM1` and `CUSTOM2` buttons on screen #11 can be used to enter user-defined cycle names.

***NOTE:** When selecting a name, all other cycle values default to the factory set values for that cycle.*



Cycle values (sterilize temperature and time, and dry time) are adjustable within the limits shown in **Table 7-1**.

- **TEMP:** For changing sterilize exposure temperature within the ranges shown.
- **STER:** For changing the sterilization exposure time. Use number touchpads to enter a new value. Left and right arrow touchpads can be used to cursor through an existing value.
- **DRY:** For changing the dry time.



NOTE: *To return cycle values to original state, press RESTORE ALL DEFAULT VALUES. This touchpad can also be used to cancel previous changes to a cycle.*

Table 7-1. Adjustment Ranges for Cycle Values

Cycle Type	Sterilize Time	Sterilize Temperature*	Dry Time
270°F (132°C) Prevac	4 - 99 minutes	270 - 274°F (132 - 134°C)	1 - 99 minutes
275°F (135°C) Prevac	3 - 99 minutes	275°F (135°C)	
270°F (132°C) SFPP	4 - 99 minutes	270 - 274°F (132 - 134°C)	0 - 99 minutes
275°F (135°C) SFPP	3 - 99 minutes	275°F (135°C)	
250°F (121°C) Gravity	30 - 99 minutes	250 - 269°F (121 - 131°C)	
270°F (132°C) Gravity	3 - 99 minutes	270°F (132°C)	
250°F (121°C) Liquid	45 - 99 minutes	250°F (121°C)	N/A
Test Cycles Dart (Bowie-Dick Test) Dart Warm-Up Leak Test	Values Cannot Be Adjusted		

* *Sterilize time limits:*
- » *Prevac or SFPP cycles set to a temperature of 270-274°F (132-134°C) are limited to a four-minute minimum sterilize time.*
- » *Prevac or SFPP cycles set to a temperature of 275°F (135°C) are limited to a three-minute minimum sterilize time.*

Once all values for the selected cycle have been adjusted, press **EXIT** to save new values and return to the cycle selection display. Upon leaving Change Values the control prints the changed cycle values.

7.2.3 Step by Step Flowchart

IMPORTANT:

Applicable cycles have been validated to satisfy the requirements outlined in **Table 4-1** and **Table 4-2**. If cycle parameters (sterilize time, dry time, temperature) other than those listed are required, it is the responsibility of the healthcare facility to consult and follow the device manufacturer's written instructions.

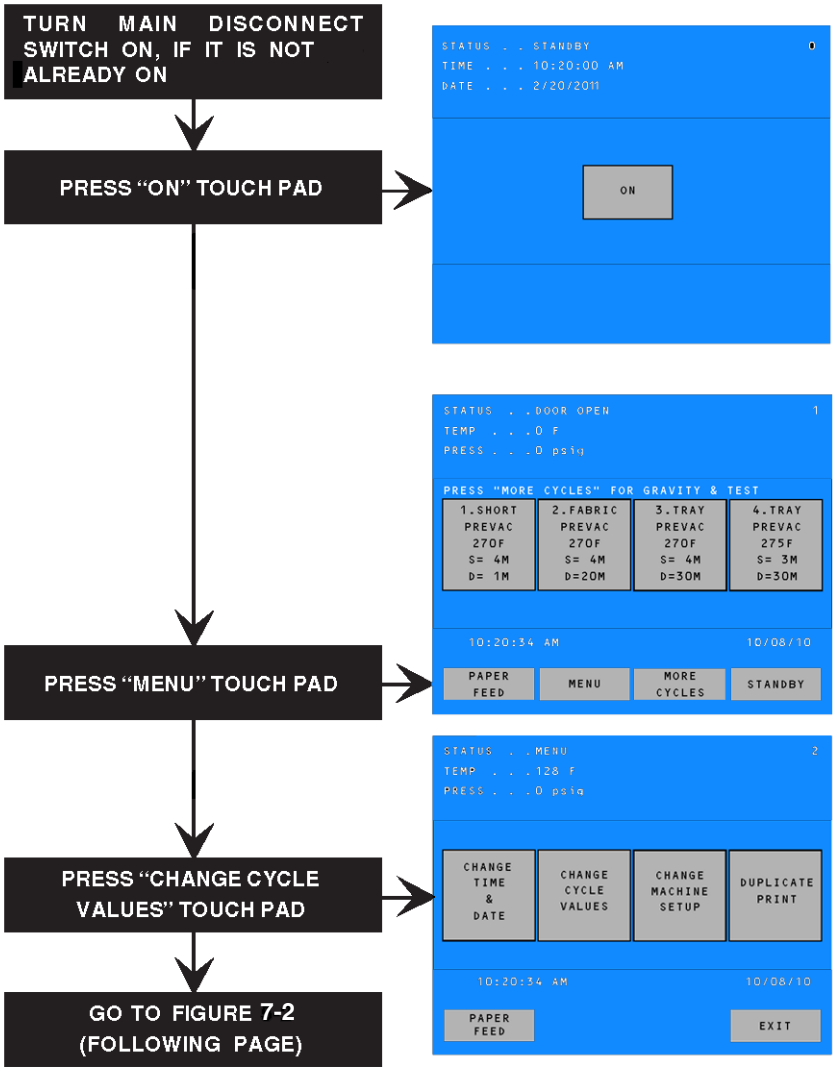

TURN MAIN DISCONNECT SWITCH ON, IF IT IS NOT ALREADY ON
PRESS "ON" TOUCH PAD
STATUS . . STANDBY
TIME . . . 10:20:00 AM
DATE . . . 2/20/2011
ON
PRESS "MENU" TOUCH PAD
STATUS . . DOOR OPEN
TEMP . . . 0 F
PRESS . . . 0 psig
PRESS "MORE CYCLES" FOR GRAVITY & TEST
1.SHORT PREVAC 270F S= 4M D= 1M
2.FABRIC PREVAC 270F S= 4M D=20M
3.TRAY PREVAC 270F S= 4M D=30M
4.TRAY PREVAC 275F S= 3M D=30M
10:20:34 AM
10/08/10
PAPER FEED
MENU
MORE CYCLES
STANDBY
PRESS "CHANGE CYCLE VALUES" TOUCH PAD
STATUS . . MENU
TEMP . . . 128 F
PRESS . . . 0 psig
CHANGE TIME & DATE
CHANGE CYCLE VALUES
CHANGE MACHINE SETUP
DUPLICATE PRINT
10:20:34 AM
10/08/10
PAPER FEED
EXIT
GO TO FIGURE 7-2 (FOLLOWING PAGE)

Figure 7-1. Accessing Change Cycle Values, Part 1 of 3

FIGURE 7-2, below, is a continuation of the flow chart in FIGURE 7-1.

Comments:

Important: Pressing **EXIT** causes the sterilizer to leave Change Values, saving any changes made to the point where **EXIT** was pressed.

A printout of cycle values and the cycle count is provided by pressing **PRINT VALUES**. Any changed cycle values and the cycle count are automatically printed after returning to screen #10 from screen #11.

If cycle is locked out, Access Code Screen (#37) appears. The access code must be entered using the following procedure:

- If the code is known, enter it using the touch screen key pad. Once the entire four digit code has been entered, press the **ENTER** touch screen pad. The access code digits are not displayed.

If the code is not known, press **MENU** to return to the previous screen.

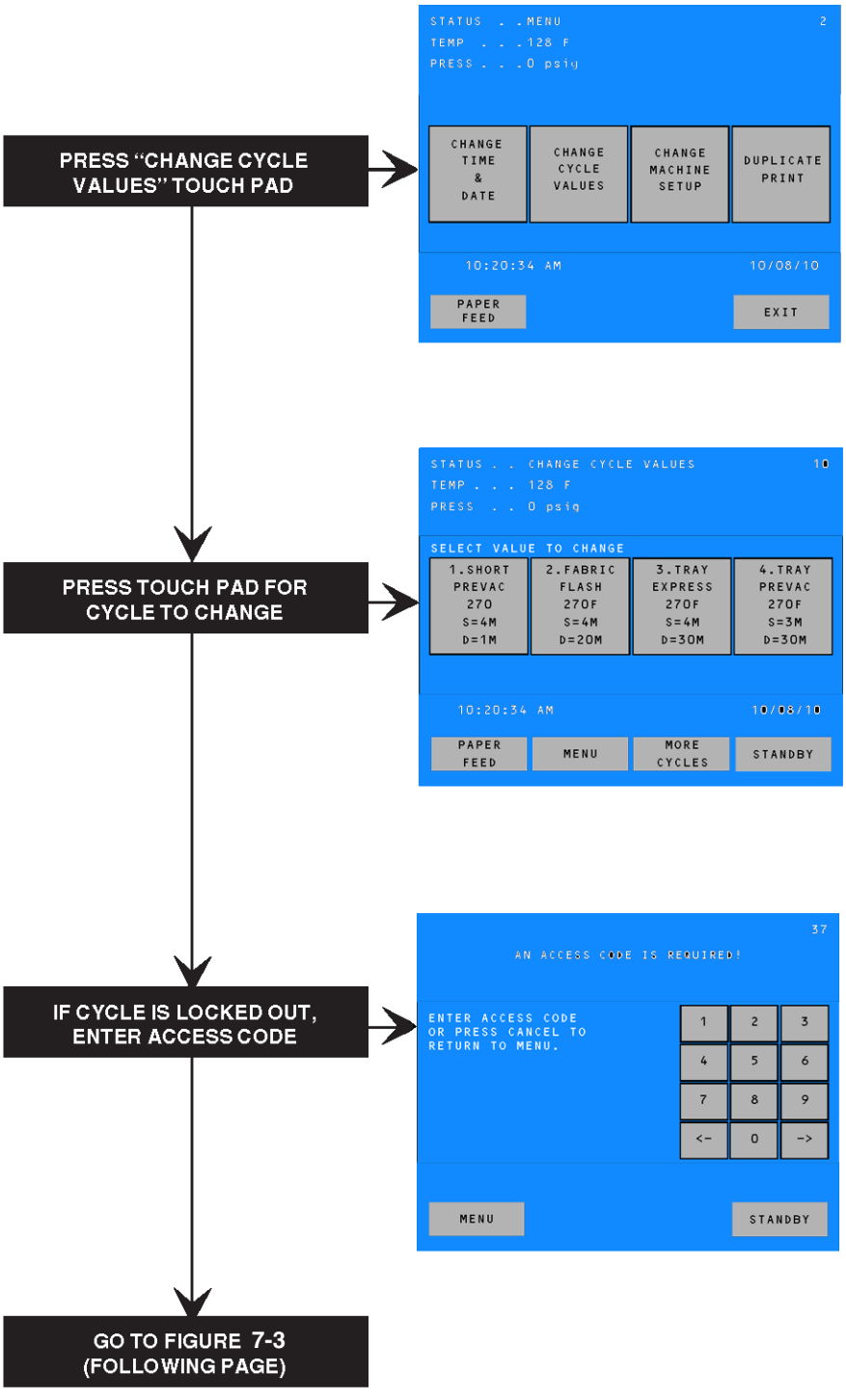


Figure 7-2. Change Cycle Values Procedure, Part 2 of 3

FIGURE 7-3 is a continuation of the flow chart in FIGURE 7-2.

Comments:

Select **Value**

- Press **NAME** touchpad to change cycle type
- Press **TEMP** touchpad change sterilization exposure temperature.
- Press **STER** touchpad to change Sterilization Exposure Time
- Press **DRY** touchpad to change Drying Time

TEMP, STER or **DRY** values can be entered or changed using the numeric touchpads. Arrow touchpads move the cursor position (for editing) left or right.

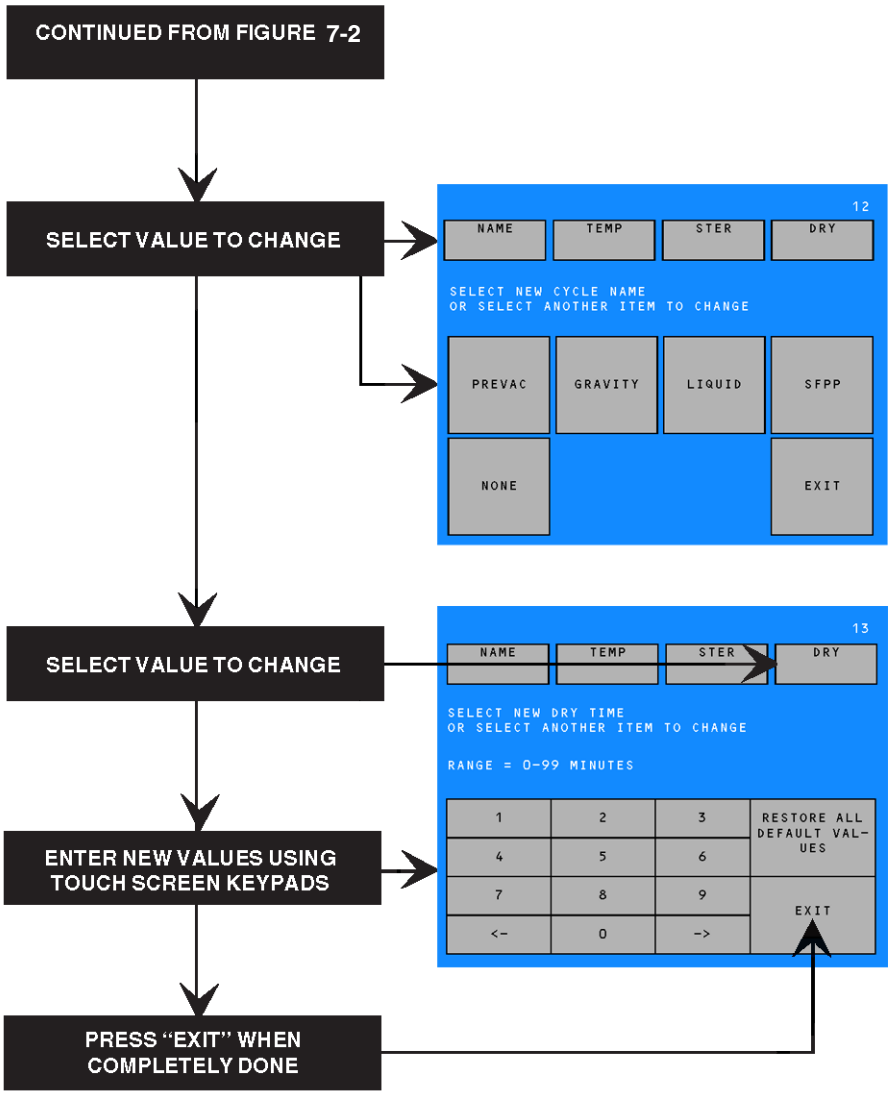
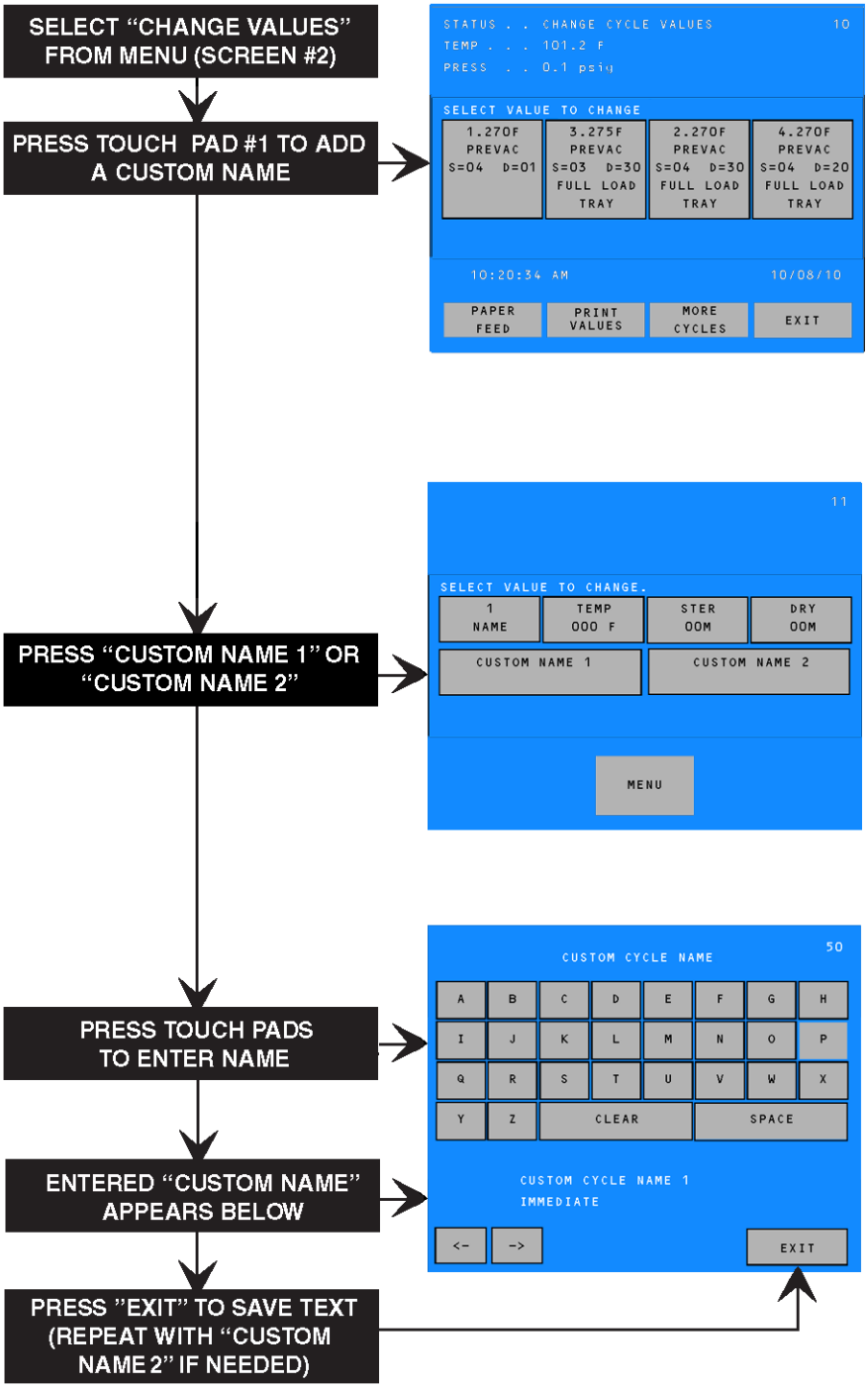


Figure 7-3. Change Cycle Values Procedure, Part 3 of 3

7.3 Entering Custom Cycle Names

EXAMPLE:

CUSTOM NAMES are used to add descriptive text to the cycle selection buttons.


SELECT "CHANGE VALUES" FROM MENU (SCREEN #2)
PRESS TOUCH PAD #1 TO ADD A CUSTOM NAME
STATUS . . CHANGE CYCLE VALUES
10
TEMP . . . 101.2 F
PRESS . . 0.1 psig
SELECT VALUE TO CHANGE
1.27OF PREVAC S=04 D=01
3.275F PREVAC S=03 D=30 FULL LOAD TRAY
2.27OF PREVAC S=04 D=30 FULL LOAD TRAY
4.27OF PREVAC S=04 D=20 FULL LOAD TRAY
10:20:34 AM
10/08/10
PAPER FEED
PRINT VALUES
MORE CYCLES
EXIT
PRESS "CUSTOM NAME 1" OR "CUSTOM NAME 2"
11
SELECT VALUE TO CHANGE.
1 NAME
TEMP 000 F
STER 00M
DRY 00M
CUSTOM NAME 1
CUSTOM NAME 2
MENU
PRESS TOUCH PADS TO ENTER NAME
50
CUSTOM CYCLE NAME
A B C D E F G H
I J K L M N O P
Q R S T U V W X
Y Z CLEAR SPACE
CUSTOM CYCLE NAME 1
IMMEDIATE
<-
->
EXIT
ENTERED "CUSTOM NAME" APPEARS BELOW
PRESS "EXIT" TO SAVE TEXT (REPEAT WITH "CUSTOM NAME 2" IF NEEDED)

- **CLEAR** button erases all text entered.
- **<-** and **->** buttons move the cursor position left or right.

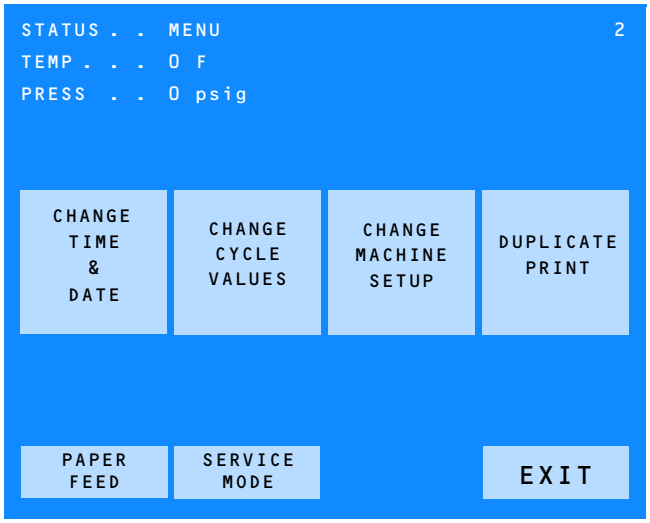
Figure 7-4. Enter or Change Custom Cycle Names

7.4 Change Time and Date

Set time and date the sterilizer uses for all display and printout messages. Refer to *Section 7.5.2, Lockout, on page 7-14* for instructions on locking the time and date change feature.

The current time and date appears on the Off/Standby (screen #0) and Status (screen #1) screens. Time and date are also shown on printouts. Verify settings periodically. To change:

1. At screen #1, press **MENU** touch screen pad. This brings the **MENU** screen #2 onto the display.
2. At screen #2, press **CHANGE TIME & DATE**. The display advances to screen #31.

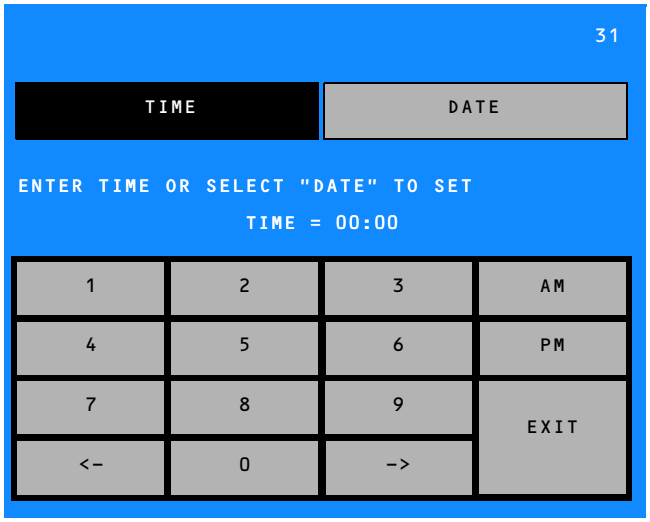


3. Make adjustments using procedures shown below:

***NOTE:** On the control display the **selected option** is always shown as a black touchpad with white lettering.*

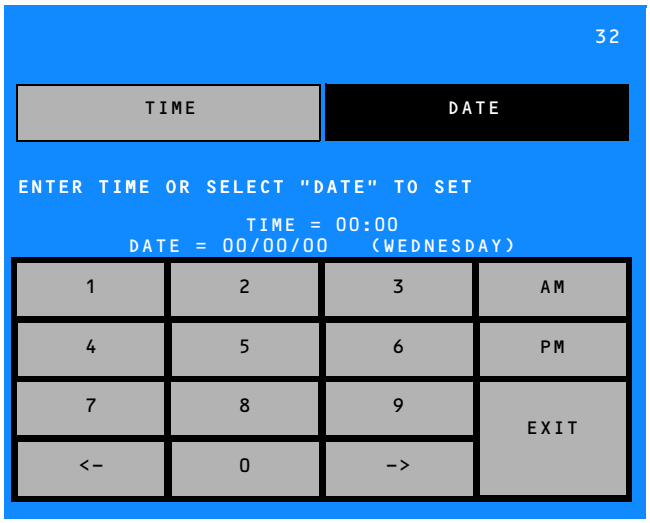
- **TIME:** At screen #31 the **TIME** touchpad is black. Enter correct time using keypad.
  a. Press the number touchpads to enter hours and minutes. For example, 10:45 would be entered by pressing **1 0 4 5 0 0**. (Set display format by referring to *Section 7.5.8, Time Format, on page 7-23*.)

b. If an incorrect number is entered, press **TIME** to start over, or use the cursor arrows at the bottom of the screen to back up to an incorrect number.



c. Once the correct time has been entered, press **EXIT** to save setting, return to Menu screen to start clock.

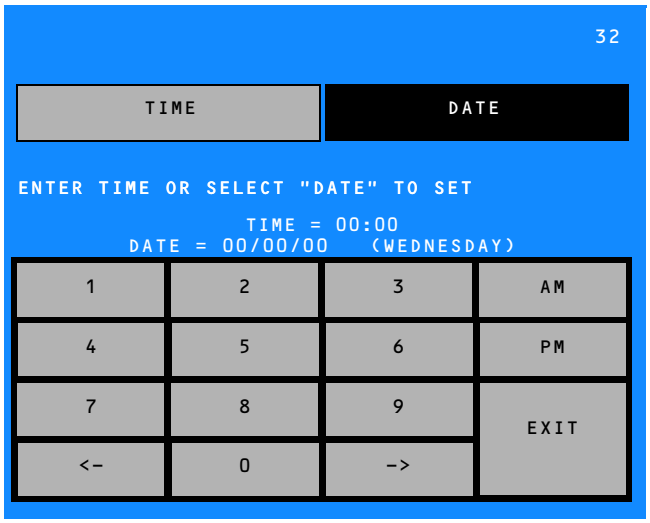
d. If necessary, press **CHANGE TIME & DATE** touchpad to return to screen #32 and adjust the date.



- **DATE:** At screen #32, press **DATE** and screen #32 appears with the **DATE** touchpad in black. Enter the correct date using the touch-screen keypad.

  a. Press the number touchpads to enter day, month and year. For example, 20 June 2012 would be entered by pressing **2 0 0 6 1 2**. (This example uses D/M/Y date format. The format can be changed to M/D/Y, or other formats. Refer to *Section 7.5.12, Date Format, on page 7-28*.

  b. If an incorrect number is entered, press **DATE** again to start over, or use the cursor key pads at the bottom of the screen to backup to an incorrect number.



c. Once the correct date has been entered, press **EXIT** to return to screen #1.

NOTE: *The day of the week is automatically understood and registered by the control.*

7.5 Change Machine Setup

All changes are made to displayed settings using touch screens. No mechanical adjustments to the sterilizer are necessary.

Generally, the Setup options are used to change the way the sterilizer operates. The control has an Access Code Security feature. If the Access Code is enabled, all or some of these options can be secured or “locked out” by the supervisor (see Access Code later in this section for more information on Access Code). All Setup options are accessed from the Setup Menu.

A summary of the setup options that can be adjusted are listed in **Table 7-2**. Each value is detailed in this section.

Table 7-2. Change Machine Setup

MACHINE SETUP	
Access Code	Once the access code has been set, all cycles values and Change Values options can be selected to lockout, making them unavailable for change by an operator without entering the Access Code.
Lockout	This setting is used to secure any of the Change Values options under the access code. Once a function is locked out, the Access Code must be entered before the setting can be accessed or changed.
Utilities Control	This setting permits the operator to program the sterilizer to automatically shut off its steam and water at the end of the work day, to conserve utilities. Shut down and power-up times can be programmed for any time of the day on Weekdays or the Weekend. ***NOTE:*** *Sterilizers equipped with an integral steam generator automatically run a generator flush-and-drain cycle one hour before sterilizer’s scheduled restart time.*
Language	This option can be used to select one of three factory set languages as the default for displays and printouts. Available languages are ENGLISH, SPANISH and FRENCH. A BILINGUAL options allows for easy changes between English and Spanish, or English and French.
Machine Number	This is used to assign a six-character, alphanumeric code to the sterilizer. This code appears in the heading of all printouts.
Time Format	This setting allows the control to display times using either AM/PM format or 24 hour format.
Print Format	This setting allows the sterilizer to print a condensed version of the cycle printout to conserve on paper usage.
Audible Signals	This option allows adjustment of ALARM, END OF CYCLE and TOUCHPAD signals tones. Tones can be independently adjusted to one of three volume levels. ALARM signal tone cannot be turned off.
Units	This is used to select the temperature and pressure units displayed and printed out by the sterilizer. The sterilizer is capable of displaying temperature as either Fahrenheit or Celsius; pressure can be displayed as psig/inHg, millibar or psia.
Date Format	The sterilizer can be programmed to change the way the date is displayed and printed. The normal setting is to display Month/Day/Year (M/D/Y); but this can be changed to Year/Month/Day (Y/M/D), or Day/Month/Year (D/M/Y).
Duplicate Print	Sterilizer can be set to automatically furnish a duplicate printout of each cycle at the end of the cycle. First line will always read — DUPLICATE PRINT — and complete printout of cycle data will be furnished.

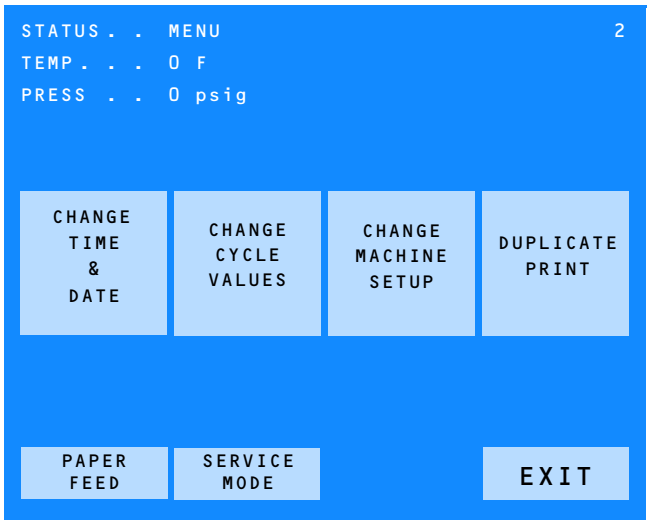
7.5.1 Access Code

This setup option is used to control access to the adjustment functions of the sterilizer control.

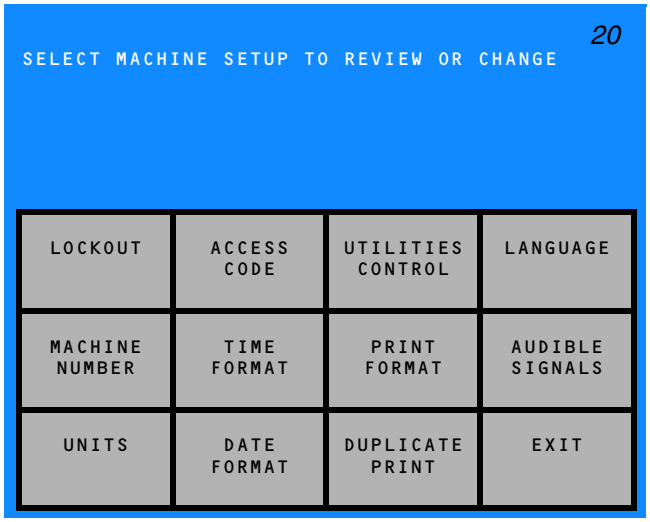
- When the Access Code is ON, a four-digit code must be entered before changing any locked-out functions.
- Functions are selected for lock out by supervisor or operator.

Enabling or Disabling the Access Code

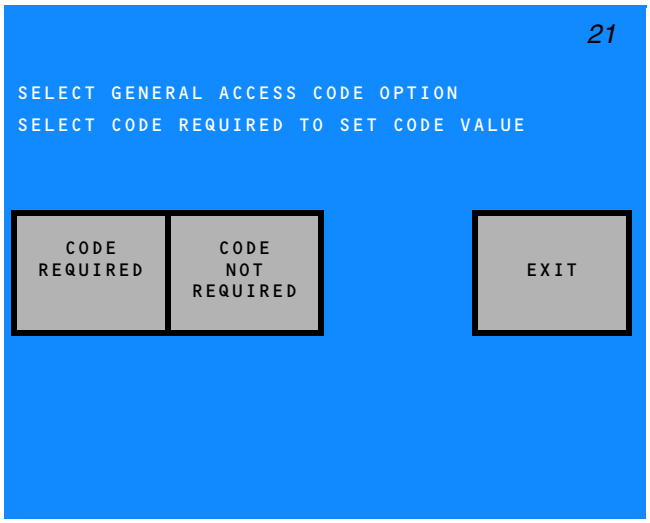
1. To access this utility, press **CHANGE MACHINE SETUP** touchpad from the Menu screen at the operating end of the sterilizer.



2. The display changes to the Change Machine Setup screen (#20). Press the touchpad labeled **ACCESS CODE.** The screen changes to the Access Code screen (#21).

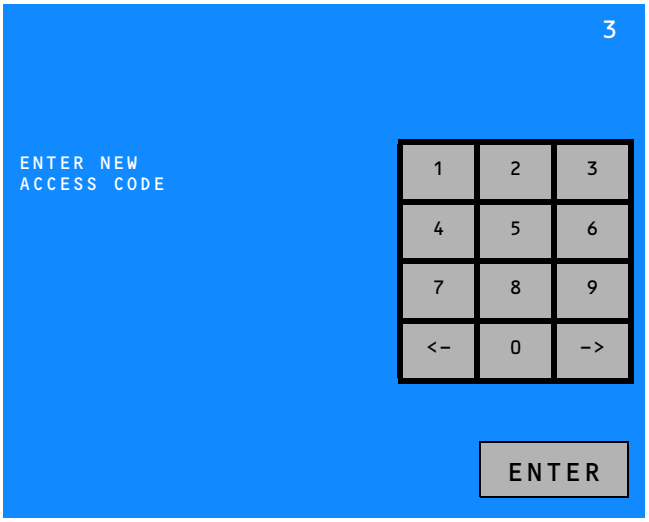


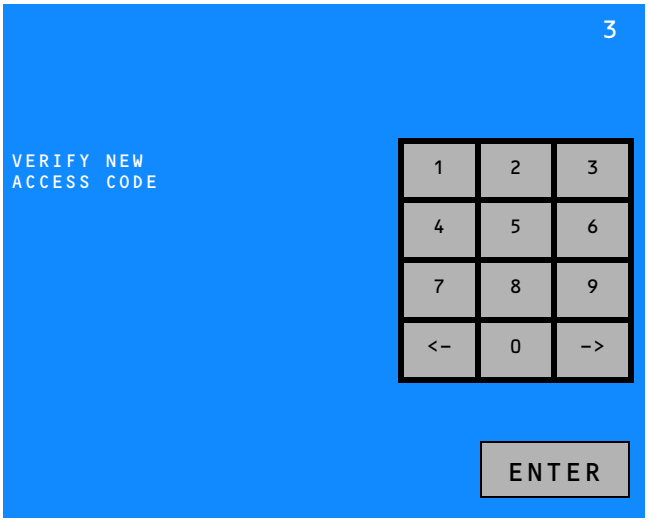
3. If the Access Code option is already turned on, the highlighted touchpad is **CODE REQUIRED**. If the Access Code is not on, highlighted touchpad is **CODE NOT REQUIRED**. Additionally, if the Access Code is not enabled, the **LOCKOUT** touchpad does not appear on screen #20. Press appropriate touchpad if you want to change Access Code status, or press **EXIT**, if no change is necessary.



- **CODE REQUIRED.** Press **CODE REQUIRED** touchpad. The display advances to screen #35. This screen prompts for the entry of a four-digit code.

  a. Use the touch-screen key pad to enter the access code.





  b. Once entered, screen prompts for Access Code to be re-entered for verification. If codes do not match, the control returns to screen #21.

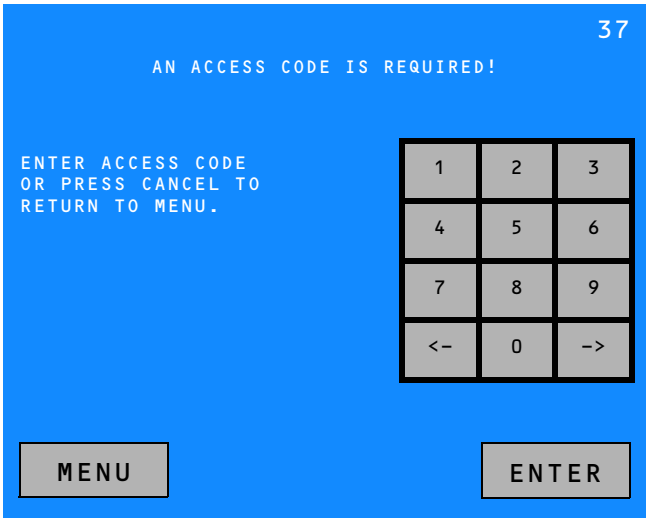
  c. If codes match, control returns to Change Machine Setup screen (#20).

- **CODE NOT REQUIRED.** If the **CODE NOT REQUIRED** touchpad is highlighted and an Access Code is not required, press the **EXIT** touchpad. The display returns to the Change Machine Setup screen (#20).

4. If the Access Code is already enabled and **ACCESS CODE** touchpad is pressed at the Change Machine Setup screen (#20), the display advances to screen #37 and the control prompts the user to enter the Access Code.
   a. Enter Code using the touchpads at the right of the screen.
   b. Once the Code has been entered, press the **ENTER** touchpad to advance to Select Access Code screen (#21).
5. If the status of the Access Code does not need to be changed, press **EXIT** to return to the Change Machine Setup screen (#20).

Entering the Access Code, Once Enabled

Once the Access Code has been set, any locked out functions or cycle values are protected from unauthorized access. If any of these locked out functions are selected, screen #37 appears on the display.



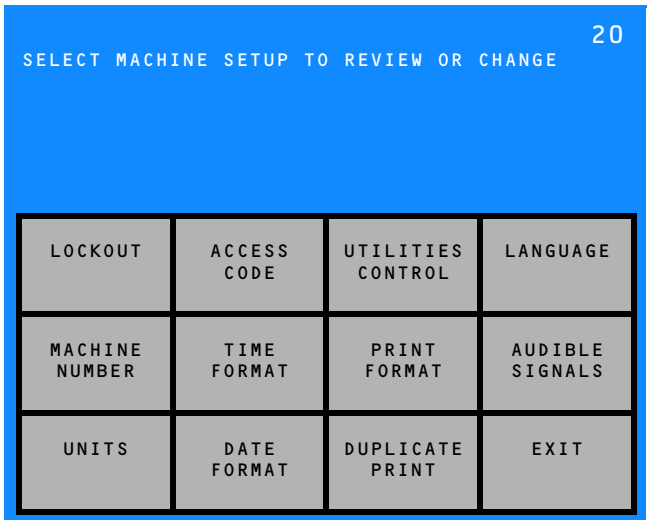
1. If the code is known, enter it using the touch-screen key pad. Once the entire four-digit code has been entered, press the **ENTER** touchpad. The access code digits are not displayed.
2. If the code is not known, press **CANCEL** to return to the previous screen.

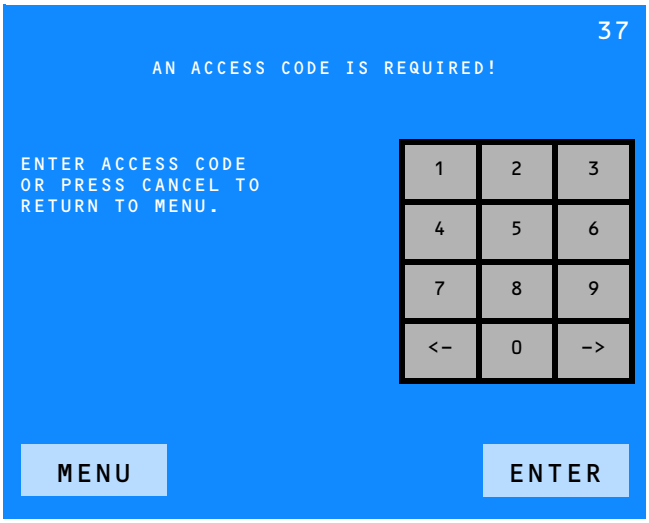
7.5.2 Lockout

This function is used to protect selected setup options from changes by unauthorized personnel. Any functions selected for lockout cannot be accessed without first entering the correct Access Code. Items can also be unlocked at this screen. Small lock graphics displayed in upper left hand corner of each touchpad indicate if item is locked or unlocked. (=unlocked, =locked.)

1. To access this utility:
   a. Press **MENU** touchpad from the Status screen (#1) at the operating end of the sterilizer.
   b. The screen changes to show the Menu screen (#2).
   c. Press the **CHANGE MACHINE SETUP** touchpad, the display changes to the Setup screen (#20).

2. Press **LOCKOUT** touchpad on the Setup menu screen (#20). The display changes to show the Enter Access Code screen (#37).





The Lockout Screen (#23) can be used to lockout the following functions:

- Cycle Values
- Machine Number
- Units
- Time & Date
- Time Format
- Date Format
- Utilities Control
- Print Format
- Duplicate Print
- Language
- Audible Signals

NOTE: *This occurs only if an Access Code is required; otherwise the unit advances to screen #23.*

a. Enter the code and press **ENTER**. The display advances to the Select Items to Lockout screen (#23).

b. If the code is not known, lockouts cannot be performed, press **CANCEL** and display changes to screen #20.

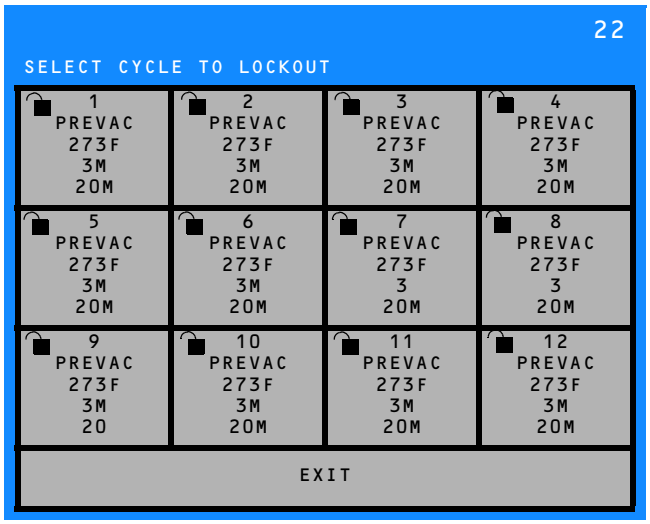
c. If the wrong Access Code is entered, Access Denied screen (#36) appears and returns to screen #20.

3. Press the touchpad for the setup options to be locked out (see list to left). The small lock graphic in the upper left corner of the screen changes to reflect the lockout status.

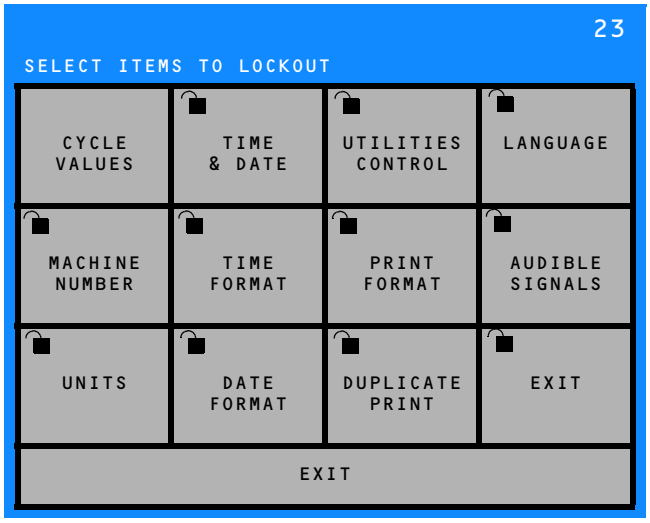
4. To select individual cycles to lock out, press **CYCLE VALUES** touchpad. The display changes to the Select Cycles to Lockout screen (#22).

a. Press the touchpad(s) for the cycles you want to lock out.

The lock graphic in the corner of the pad changes to reflect the lockout status.


22
SELECT CYCLE TO LOCKOUT
1 PREVAC 273F 3M 20M
2 PREVAC 273F 3M 20M
3 PREVAC 273F 3M 20M
4 PREVAC 273F 3M 20M
5 PREVAC 273F 3M 20M
6 PREVAC 273F 3M 20M
7 PREVAC 273F 3 20M
8 PREVAC 273F 3 20M
9 PREVAC 273F 3M 20
10 PREVAC 273F 3M 20M
11 PREVAC 273F 3M 20M
12 PREVAC 273F 3M 20M
EXIT

b. Press **EXIT** to return to the Lockout screen (#23).



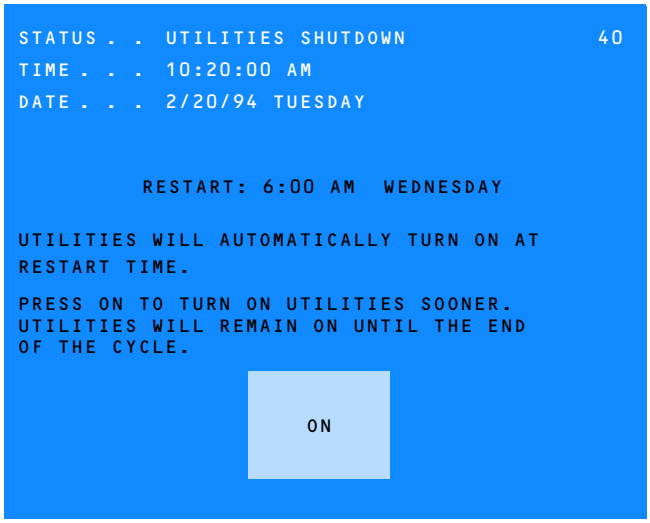
5. When all setup options to be locked out have been selected, press **EXIT** to return to the main setup menu.

7.5.3 Utilities Control

This screen is used to automatically control utility services to the sterilizer. This utility is factory-set to Manual Utilities control (i.e., utilities must be shut off and turned on by an operator). Using this utility, the sterilizer can be set to control the following:

- Daily shut off time
- Daily start up time
- Start up and shut off times for all week days
- Integral steam generator flush cycle start time and duration[1]
- Start up and shut off times for weekend days

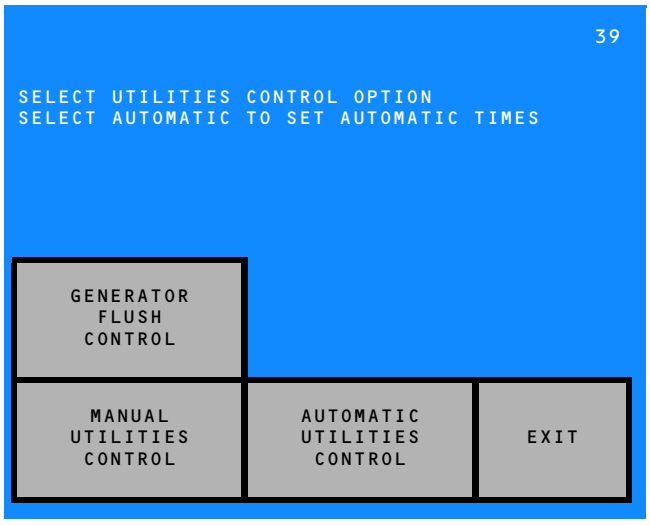
1. *Only available for sterilizers equipped with integral steam generator.*


STATUS . . UTILITIES SHUTDOWN
40
TIME . . . 10:20:00 AM
DATE . . . 2/20/94 TUESDAY
RESTART: 6:00 AM WEDNESDAY
UTILITIES WILL AUTOMATICALLY TURN ON AT RESTART TIME.
PRESS ON TO TURN ON UTILITIES SOONER. UTILITIES WILL REMAIN ON UNTIL THE END OF THE CYCLE.
ON

Screen displayed in Auto Utility Shutdown.

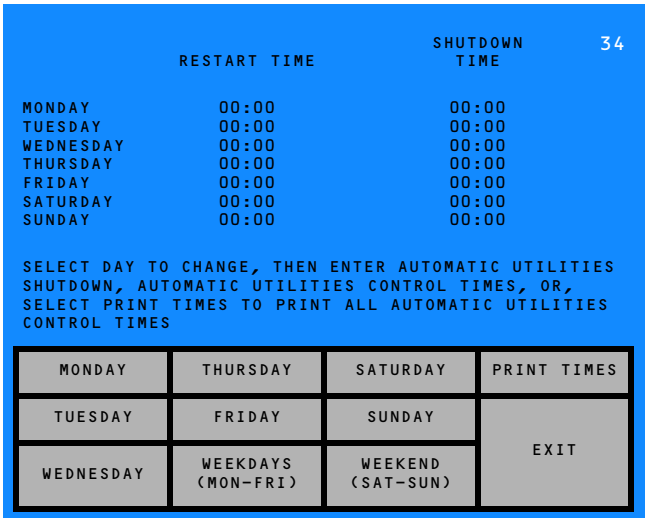
If the sterilizer is processing a cycle when the utility shut down time arrives, the cycle completes before the sterilizer shuts itself off. The sterilizer can be manually restarted for 30 minutes at any time during utility shutdown by pressing the **ON** touchpad at the Off/Standby screen (#0).

1. To access this utility, press the **MENU** touchpad from the Main Status screen (#1) at the operating end of the sterilizer.
2. The display changes to the Menu screen. Press the **CHANGE MACHINE SETUP** touchpad. The display changes to the Setup screen. Press the **UTILITIES CONTROL** touchpad. The screen changes to the Utilities Control screen (#39).

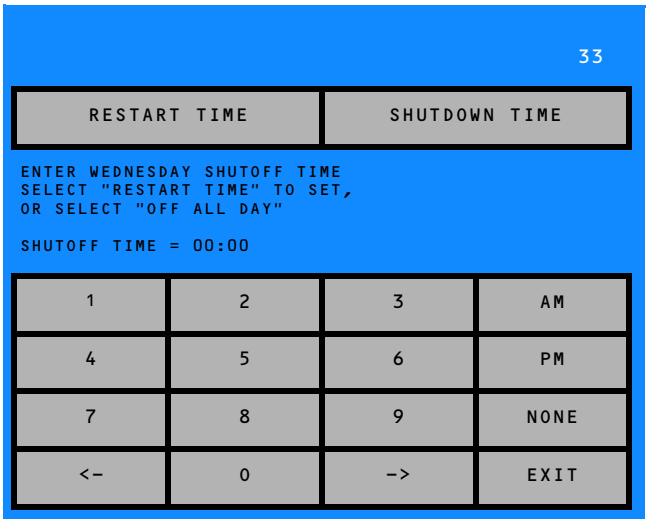


- **MANUAL UTILITIES CONTROL.** This is the default condition for the sterilizer. Press this touchpad to cancel all automatic utilities controls. Press EXIT to return to the Change Machine Setup screen (#20).
- **AUTOMATIC UTILITIES CONTROL.** Press this to advance to screen #34.

- **GENERATOR FLUSH CONTROL** allows set up and control of generator flush time and duration when manual utilities control is being used. (See *Section 7.5.5, Steam Generator Flush Cycle, on page 7-21*.)



a. A range of days can be selected by pressing either the WEEKDAYS/ (MON – FRI) or the WEEKEND/(SAT – SUN) touchpads. To select a specific day (or days) to adjust Utilities Control, press the appropriate touchpad.



b. The display changes to screen #33. At this screen the start up times and shut off times are entered using the touch-screen key pad. The time is entered as a *four-digit number* (e.g.,0 6 0 0 for 6:00).

NOTE: *If 24-hr time is selected, AM and PM touchpads will not be displayed and screen #33 is replaced by screen #44.*

NOTE: *The times entered for start up and shut down apply to all the days in the selected range.*

NOTE: *The NONE touchpad is used to set no start up or shut off times for the selected day(s). NONE can be used to turn off utilities for any or all days in the range. Screen #34 will show OFF ALL DAY for the selected day(s).*

Once the start up and shut off times have been selected, press EXIT to return to the Change Machine Setup screen (#20).

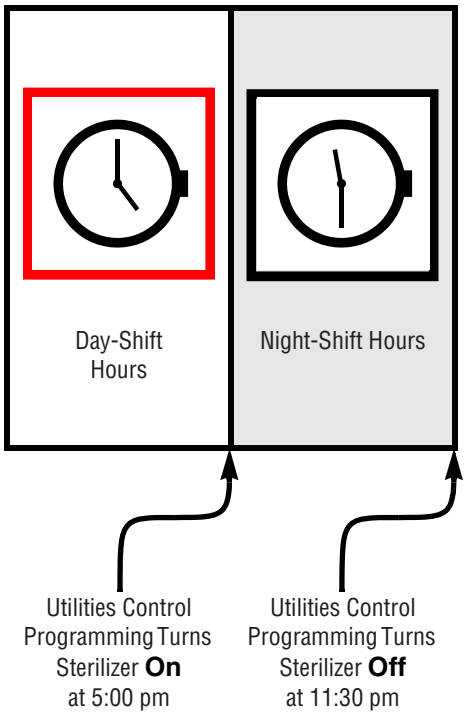
See the following example to program automatic utilities control:

Example: The sterilizer is to be used five days a week (Monday through Friday), with a daily start up time of 07:00 and a shut down time of 18:30. The sterilizer will also be used Saturday morning from 06:00 through 12:00.

1. At screen #20, press the UTILITIES CONTROL touchpad.
2. At screen #39, press the AUTOMATIC UTILITIES CONTROL touchpad.
3. At screen #34, press the WEEKDAYS touchpad.
   a. Enter the 07:00 restart time by pressing 0 7 0 0 touchpads.
   b. Press the SHUTOFF TIME touchpad.
   c. Enter the 18:30 shut off time by pressing 1 8 3 0 touchpads.
   d. Press the EXIT touchpad.
   e. At screen #34 press the SATURDAY touchpad.
   f. Enter the Saturday restart time by pressing the 0 6 0 0 touchpads.
   g. Enter the Saturday shut off time by pressing the 1 2 0 0 touchpads.
   h. Press EXIT.
   i. At Screen #34, press SUNDAY, and at screen #33 press NONE.

The utilities control function is now programmed to turn the sterilizer's utilities on at 07:00 and off at 18:30 Monday through Friday. On Saturday the utilities will be on between 06:00 and 12:00. Utilities will be off all day Sunday.

NOTE: Some sterilizers are operated exclusively on the night shift. In such cases, it may be useful to set shutdown and restart times so the sterilizer operates during the evening hours and is shut down during the day. The diagram below shows one example of how this can be done.


Day-Shift Hours
Night-Shift Hours
Utilities Control Programming Turns Sterilizer On at 5:00 pm
Utilities Control Programming Turns Sterilizer Off at 11:30 pm

7.5.4 Steam Generator Flush and Drain Set Up

If a building steam source is not available, the sterilizer may be equipped with an electric steam generator. The generator automatically converts water to steam using electric heat. The steam created is then used to power the sterilizer.

Steam generators are highly susceptible to mineral scaling if the supplied water has any level of hardness. Refer to **Table 7-3** for water quality requirements.

Important: Regardless of the hardness level of supplied water, the generator must be flushed every day before use to prevent mineral scaling or carryover of debris into the chamber.

NOTE: *Warranty on this steam generator will be voided unless daily flushing procedures are performed.*

The sterilizer will automatically flush the generator. See *Section 7.5.3, Utilities Control, on page 7-16* for information on setting the duration and start time of the automatic generator flush.

NOTE: *The generator must be flushed every day before use.*

Table 7-3. Required Feed Water Quality for Carbon Steel Steam Generators

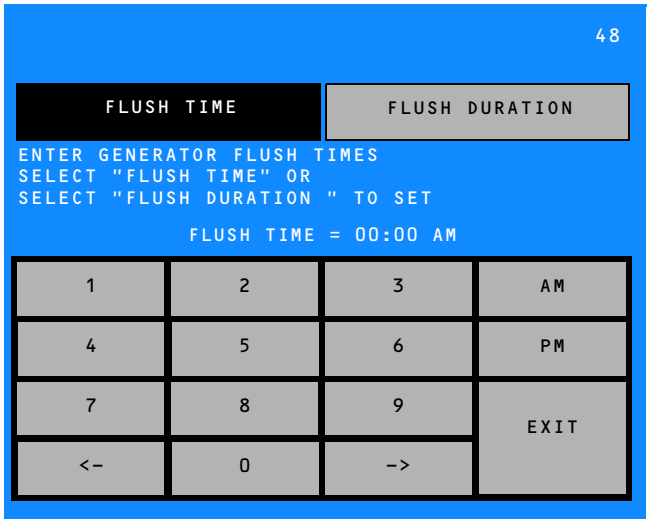
Condition	Nominal Conditions	Maximum Conditions
Temperature	as supplied	140° F (60° C)
Total Hardness as CaCO3*	0-17 mg/L	130 mg/L
Total Dissolved Solids	50-150 mg/L	250 mg/L
Total Alkalinity as CaCO3	50-100 mg/L	180 mg/L
pH	6.8-7.5	6.5-8.5
Total Silica	0.1-1.0 mg/L	2.5 mg/L
Resistivity - ohms/cm	2000-6000	26000

** 17.1 mg/L = 1 grain hardness*

7.5.5 Steam Generator Flush Cycle

The **FLUSH TIME** function shown on Screen #48 is active only when **Automatic Utilities Control** has been enabled (see *Section 7.5.3, Utilities Control, on page 7-16*). The **FLUSH DURATION** set up function is always used when the sterilizer is equipped with an integral steam generator. Flush *duration* applies if utilities are being controlled automatically or manually.

1. Select the **Generator Flush Option** from screen #39. The control advances to the generator flush and drain scheduling screen (#48).
2. At screen #48, select **FLUSH TIME** and schedule the time of day for the generator flush and drain.



3. Once the time day for the generator flush sequence has been scheduled, press **EXIT** to return to screen #48.

Refer to *Section 7.5.4, Steam Generator Flush and Drain Set Up, on page 7-20*.

Use the keypad to enter the duration length for the FLUSH phase of the cycle.

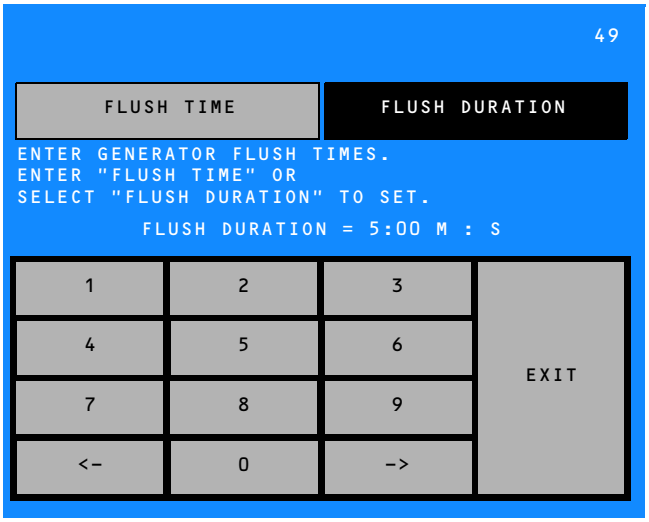


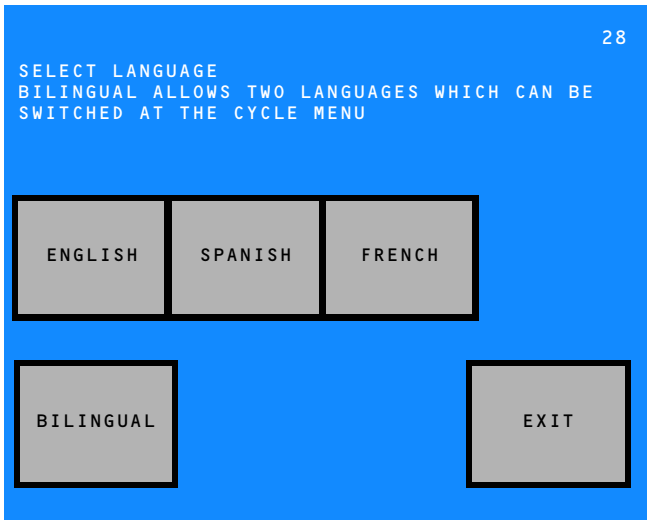
Figure 7-5. Generator Flush Duration Time Control Screen

4. Press **FLUSH DURATION** and enter the duration time for the generator flush sequence. Press **EXIT** to return Screen #48. Press **EXIT** again at Screen #48 to return to the Utilities Control screen (#39). Minimum flush duration time is five minutes. The control defaults to a five-minute flush duration as shipped.

7.5.6 Language

The AMSCO C Series sterilizer is capable of operation with display screens and printouts in two of three languages. The factory default is **ENGLISH**. A **BILINGUAL** option can be used to easily change languages between shifts or whenever necessary.

1. To access this utility, press the **MENU** touch screen pad from the main status screen (#1) at the operating end of the sterilizer. The screen changes to show the Change Machine Setup screen (#20).
2. Press the **LANGUAGE** touch screen pad on the Change Machine Setup screen (#20). The display advances to show Select Language screen (#28).
3. Select the appropriate language by pressing one of the touch screen pads in the middle of the display.

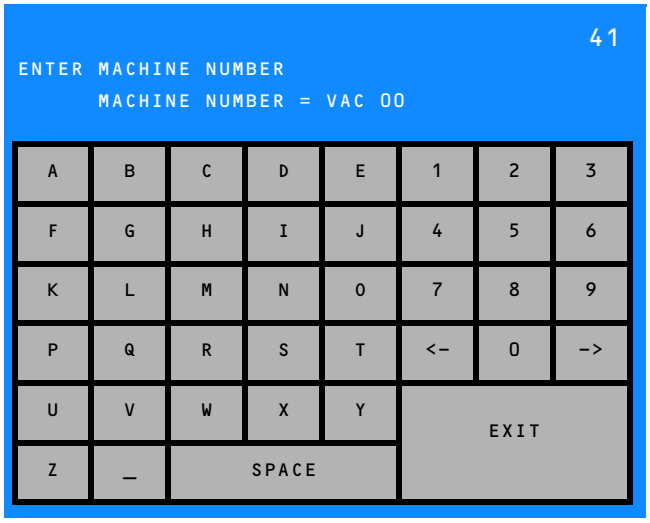


4. The **BILINGUAL** option can be selected to allow operators to toggle between English and the other language available without entering Change Machine Setup. The other language touchpad appears on the main menu. In this way, another language can be selected during operation without going to the CHANGE MACHINE SETUP menu.
5. Once the appropriate language is selected press **EXIT** to return to the Change Machine Setup screen (#20).

7.5.7 Machine Number

This set up is used to enter an identifying, two-character code into the sterilizer control. This code can be letters, numbers or a combination of both. The Machine Number code is printed out in the header for each cycle, allowing for processed goods to be traced back to a specific sterilizer when needed. If this option has been set to a value between 1 and 9, cycle complete tone sounds the set number of times.

1. To access this feature, press the **MENU** touchpad at screen #1: at screen #2 press Change Machine Setup. The display advances to screen #20.
2. At screen #20, press **MACHINE NUMBER** touchpad; the display advances to screen #41.



3. At screen #41, enter the two-character code for the sterilizer. Any letter, number, or combination can be used as the machine number. Ensure however, that each machine number used is different from any others that have been used in the facility.

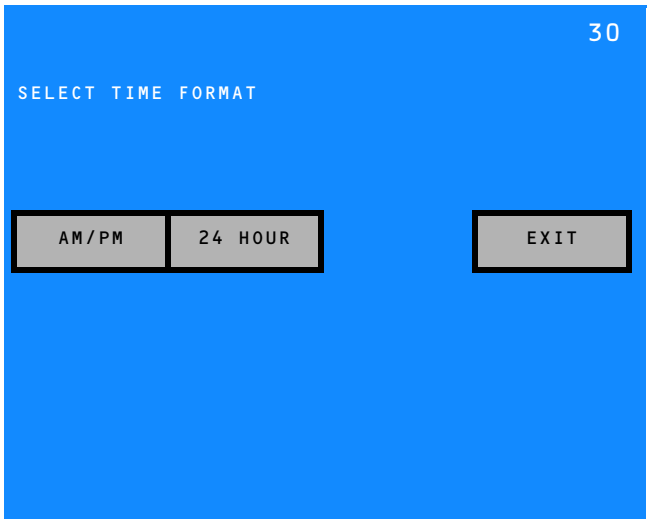
***NOTE:** Dash and space touchpads have been provided.*

4. Once the machine number has been entered, press EXIT to return to screen #20.

7.5.8 Time Format

This setup option allows the operator to select the "format" for the time. The format determines how hours and minutes are displayed. There are two options — the default format shows time in the military format (referred to as 24 HOUR); the optional format shows time in AM/PM format.

1. To access this utility, press **MENU** touchpad from the main status screen (#1) at the operating end of the sterilizer. The screen changes to show the Menu screen (#2). Press **CHANGE MACHINE SETUP** touchpad, the display advances to screen #20.
2. At screen #20, press **TIME FORMAT** touchpad. The display advances to screen #30.

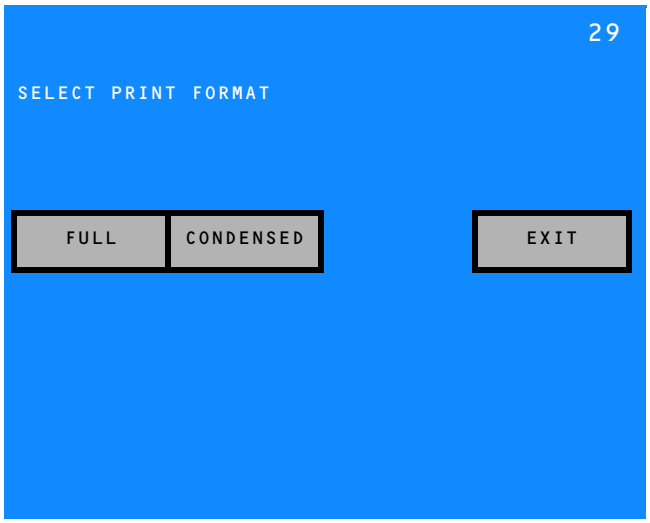


3. Select the appropriate time format by pressing one of the two touchpads in the lower half of the display.
   - **AM/PM** – This is the standard civilian time format.
   - **24 HOUR** – This is a 24 hour format associated with military timekeeping.
4. Once the appropriate format has been selected, or if format does not need to be changed, press **EXIT** to return to the Change Machine Setup screen (#20).

7.5.9 Print Format

This setup option allows the operator to select the cycle printout "format." The format determines the type of printout the sterilizer provides during processing. Two options are available. The default **FULL** format provides status prints at each transition point in the cycle, plus additional status at interval points during each phase of the cycle. The optional **CONDENSED** format provides a cycle summary and complete time, without additional status prints at cycle interval points. The **CONDENSED** format can be used to conserve printer paper. Refer to Figure 7-6.

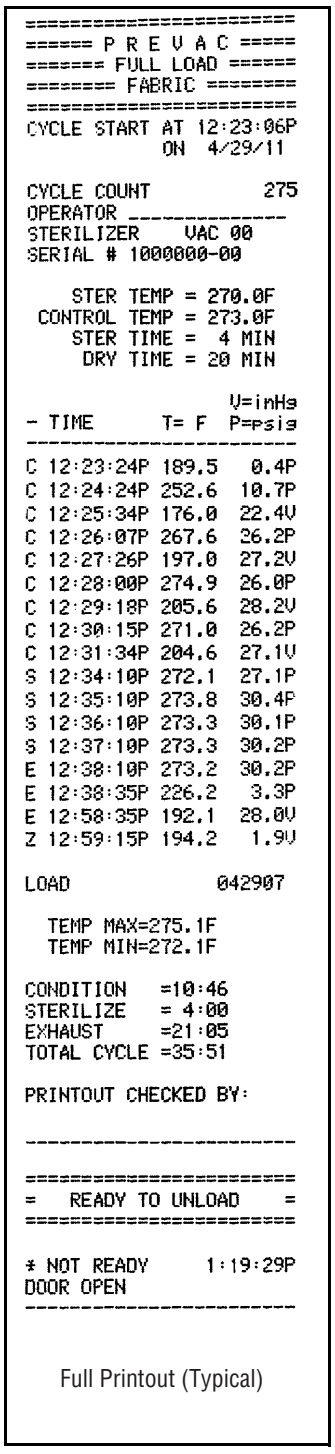
1. To access this utility, press the **MENU** touchpad from the Status screen (#1) at the operating end of the sterilizer. The screen changes to show the menu screen (#2). Press the **CHANGE MACHINE SETUP** touchpad.
2. Press **PRINT FORMAT** touchpad on the Change Machine Setup screen (#20); the display advances to screen #29.



3. Select the appropriate print format by pressing one of the two touchpads in the lower half of the display.

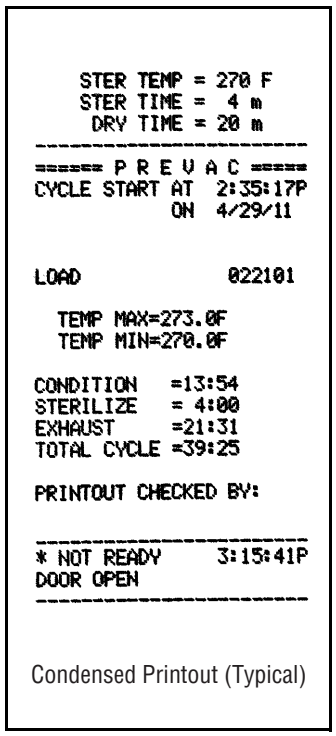
- **FULL** – This is the standard format providing a status print for each phase of the cycle and status prints at the predetermined Print Interval.
- **CONDENSED** – This format provides an abbreviated cycle status printout.

4. Once the appropriate format is selected, press **EXIT** to return to the Change Machine Setup screen (#20).



```
========================
====== P R E V A C =====
======= FULL LOAD ======
======== FABRIC ========
========================
CYCLE START AT 12:23:06P
            ON  4/29/11

CYCLE COUNT          275
OPERATOR _____________
STERILIZER    VAC 00
SERIAL # 1000000-00

    STER TEMP = 270.0F
 CONTROL TEMP = 273.0F
    STER TIME =  4 MIN
     DRY TIME = 20 MIN

                    V=inHg
- TIME      T= F  P=psig
------------------------
C 12:23:24P 189.5   0.4P
C 12:24:24P 252.6  10.7P
C 12:25:34P 176.0  22.4V
C 12:26:07P 267.6  26.2P
C 12:27:26P 197.0  27.2V
C 12:28:00P 274.9  26.0P
C 12:29:18P 205.6  28.2V
C 12:30:15P 271.0  26.2P
C 12:31:34P 204.6  27.1V
S 12:34:10P 272.1  27.1P
S 12:35:10P 273.8  30.4P
S 12:36:10P 273.3  30.1P
S 12:37:10P 273.3  30.2P
E 12:38:10P 273.2  30.2P
E 12:38:35P 226.2   3.3P
E 12:58:35P 192.1  28.0V
Z 12:59:15P 194.2   1.9V

LOAD            042907

  TEMP MAX=275.1F
  TEMP MIN=272.1F

CONDITION   =10:46
STERILIZE   = 4:00
EXHAUST     =21:05
TOTAL CYCLE =35:51

PRINTOUT CHECKED BY:

------------------------

========================
=   READY TO UNLOAD    =
========================

* NOT READY     1:19:29P
DOOR OPEN
------------------------
```

Full Printout (Typical)



```
    STER TEMP = 270 F
    STER TIME =  4 m
     DRY TIME = 20 m
------------------------
====== P R E V A C =====
CYCLE START AT  2:35:17P
            ON  4/29/11


LOAD             022101

  TEMP MAX=273.0F
  TEMP MIN=270.0F

CONDITION   =13:54
STERILIZE   = 4:00
EXHAUST     =21:31
TOTAL CYCLE =39:25

PRINTOUT CHECKED BY:

------------------------
* NOT READY     3:15:41P
DOOR OPEN
------------------------
```

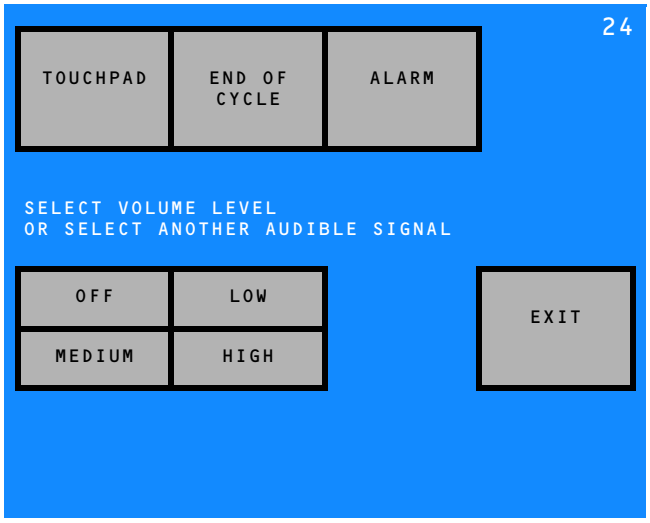
Condensed Printout (Typical)

Figure 7-6. Sample Full and Condensed Printouts

7.5.10 Audible Signals

This setup option allows the operator to adjust selected audible signals heard at the sterilizer control. Three signals can be adjusted. Touchpad and end of cycle signals can be adjusted to one of three volume levels or turned off. Only the volume level of the Alarm signal can be adjusted. The Alarm signal cannot be turned off.

1. To access this utility, press the **MENU** touchpad from the Status screen (#1), at the operating end of the sterilizer. The screen changes to show Change Machine Setup screen (#20).
2. Press **CHANGE MACHINE SETUP** on the Menu screen, then **AUDIBLE SIGNALS** on the Setup screen (#20). The display advances to the Audible Signals setup screen (#24).



3. Select the signal you wish to adjust by pressing the appropriate touchpad in the upper half of the screen.
   - **TOUCHPAD** – This is the signal sounded by the control whenever anyone presses a touchpad.
   - **END OF CYCLE** – This is the signal heard when a cycle is complete.
   - **ALARM** – This is a two-tone signal heard during abnormal conditions.

   a. Each audible signal can be adjusted for volume.

      1) First press the touchpad for the selected type of signal (e.g., **ALARM, END OF CYCLE** or **TOUCHPAD**).

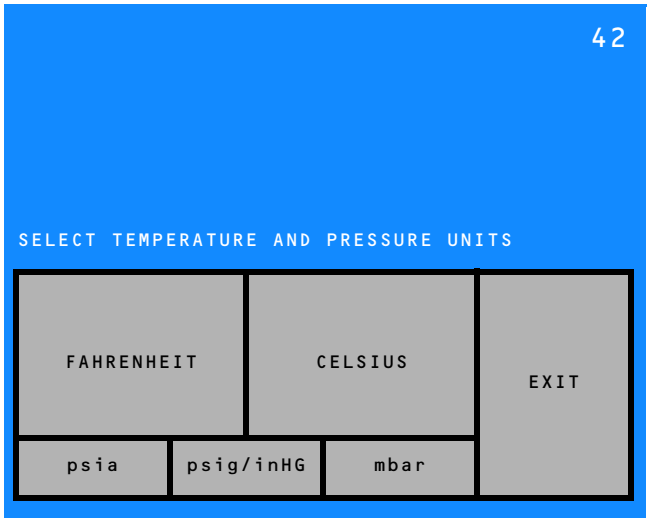
      2) Once the signal has been selected, press the required volume level (e.g., **LOW, MEDIUM** or **HIGH**).

   b. **TOUCHPAD** and **END OF CYCLE** provide an **OFF** setting. The **ALARM** signal cannot be turned off.
4. Once the appropriate Audible Signals and Signal volumes have been selected, or if these do not need to be changed, press **EXIT** to return to the Change Machine Setup screen (#20).

7.5.11 Units

This feature is used to select or change the units the sterilizer uses when displaying and printing chamber temperature and pressure. This function allows selection of either Fahrenheit or Celsius units for displaying and printing temperature. Pressure units can be changed between psig/inHg, mbar or psia. Changing units does not require recalibrating the sterilizer.

1. To access this feature, press the Menu touch-screen pad at screen #1; at screen #2 press **CHANGE MACHINE SETUP**. The display advances to screen #20.
2. At screen #20, press **UNITS** touch-screen pad; the display advances to screen #42.

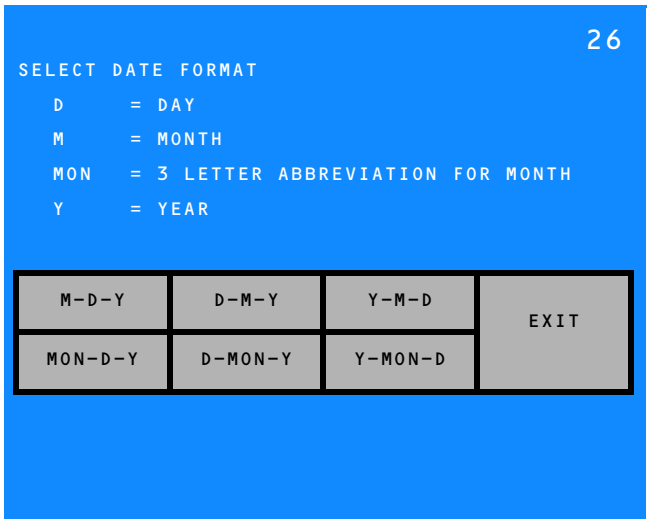


3. At screen #42, press the appropriate touchpad for the type of unit or units required. Once all units have been selected, press **EXIT** to return to screen #20.

7.5.12 Date Format

This setup option allows the operator to select the "format" for the date. The format determines the order in which the month, day and year are displayed. There are three options, and the option selected is a matter of either preference or geographical location.

1. To access this utility, press the **MENU** touchpad from the Status menu (#1). Press the **CHANGE MACHINE SETUP** touchpad, the control advances to the Change Machine Setup screen (#20).
2. Press **DATE FORMAT** touchpad at screen #20; the display advances to screen #26.
3. Select the date format appropriate for your location by pressing one of the six touchpads in the lower half of the display.
   - **M-D-Y** – Month-Day-Year
   - **D-M-Y** – Day-Month-Year



- **Y-M-D** – Year-Month-Day
- **MON-D-Y** – Month-Day-Year*
- **D-MON-Y** – Day-Month-Year*
- **Y-MON-D** – Year-Month-Day*

** When selecting the format touchpads in the bottom row, MON = 3 letter abbreviation of the month.*

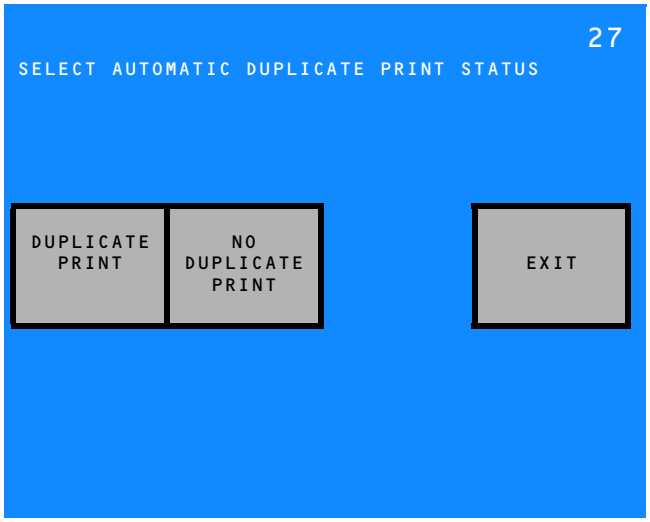
4. Once the appropriate format has been selected, or if format does not need to be changed, press **EXIT** to return to the Change Machine Setup screen (#20).

7.5.13 Duplicate Print

This setup option allows the Customer to select whether the sterilizer automatically supplies an extra printout at the end of the cycle. There are two options; the option selected depends on operating requirements in your facility. The default setting is for no duplicate print.

1. To access this utility, press **MENU** touchpad from the main status screen (#1) at the operating end of the sterilizer. The screen changes to show the menu screen (#2). Press **CHANGE MACHINE SETUP** touchpad; the display advances to screen #20.

2. Press **DUPLICATE PRINT** touchpad on the Change Machine Setup screen. The display advances to screen #27.



3. At screen #27, select the appropriate print option by pressing one of the touchpads in the lower half of the display.
   - **DUPLICATE PRINT** – The sterilizer provides a second printout of the last previous cycle after the cycle completes.
   - **NO DUPLICATE PRINT** – This is the normal default setting. The sterilizer does not provide an additional printout at the end of the cycle.
4. Once the appropriate format has been selected, or if format does not need to be changed, press **EXIT** to return to the Change Machine Setup screen (#20).

7.6 Leaving Change Values

1. Press **EXIT** at screen #20 to return to Menu screen #2.
2. Press **EXIT** at screen #2 to return to Status screen #1.

ROUTINE MAINTENANCE

8

WARNING – PERSONAL INJURY HAZARD and/or EQUIPMENT DAMAGE HAZARD: Regularly scheduled preventive maintenance is required for safe and reliable operation of this equipment. Contact your STERIS Service Representative to schedule preventive maintenance.

WARNING – PERSONAL INJURY HAZARD and/or EQUIPMENT DAMAGE HAZARD: The performance of the 510k cleared AMSCO C Series Sterilizer is validated as a system including components defined by STERIS in the Operator Manual and Service Manual for the AMSCO C Series Sterilizer. Substitution of unauthorized components can potentially lead to personal injury, damage or premature failure of the product and result in a unit configuration that is inconsistent with the validated, FDA cleared product. STERIS' warranty is void if components are used that are not approved. DO NOT USE components that are not validated as part of the AMSCO C Series Sterilizer.

8.1 Preventive Maintenance Schedule

Maintenance procedures should be performed regularly at the intervals indicated using the maintenance schedule below as a guide. Local conditions (water quality, usage, etc.) may require more frequent maintenance than indicated.

Important: Follow all safety procedures including Lock out/Tag out.

Inspection Frequency: The AMSCO® C Series Small Steam Sterilizer must be inspected twice each year. Operator inspections must be made on a daily or weekly basis as indicated in *SECTION 8.2, DAILY MAINTENANCE PROCEDURES* and *SECTION 8.3, WEEKLY MAINTENANCE PROCEDURE: FLUSH CHAMBER DRAIN*.

Table 8-1. Preventive Maintenance
Periodic Maintenance Schedule for AMSCO C Series Small Steam Sterilizer

Service Required	Minimum Inspection Frequency
1.0 Administrative	**2 x per year (4 x w/generator)**
1.1 Discuss equipment operation with operator.	
2.0 Restorative – Rebuilds and replacements	**1 x per year unless noted**
2.1 Rebuild steam manifold	
2.2 Rebuild water manifold	
2.3 Rebuild Jacket Trap	
2.4 Replace safety valve	
2.5 Replace air filter	
2.6 Rebuild Pressure Regulator (PRV)	
2.7 Replace jacket trap check valve (CK3)	
2.8 Rebuild exhaust manifold	
2.9 Replace check valve (CK14)	
STEAM GENERATOR (If applicable)	

Table 8-1. Preventive Maintenance Periodic Maintenance Schedule for AMSCO C Series Small Steam Sterilizer	
Service Required	**Minimum Inspection Frequency**
2.10 Sight Glass & Seal replace	**2 x per year**
2.11 Safety valve replace	
2.12 Check valve replace	
2.13 Steam outlet valve rebuild	
2.14 Feed water valve rebuild	
3.0 Calibration – Temperature & Pressure - Annual	**1 x per year**
4.0 Routine Maintenance	**2 x per year unless noted**
4.1 Check chamber level sensor	
4.2 Verify door operation	
STEAM GENERATOR (If applicable)	**4 x per year (4.3 - 4.12)**
4.3 Check appearance for leaks and damage	
4.4 Check sight glass for leaks or cracks	
4.5 Check relays and contactors for arc damage or wear	
4.6 Check heater wiring for cracking or damage	
4.7 Flush or blow down unit per P764332-324/325	
4.8 Check strainer	
4.9 Check pump motor clamp	
4.10 Remove and clean conductivity/float probes	
4.11 Examine probe baffle tube for wear (if equipped)	
4.12 De-scale per procedure P764326-931	
4.13 Re-install panels, clean area and test	
5.0 Final Test/Administrative	**2 x per year (4 x w/generator)**
5.1 Run test cycle (Vacuum Leak Test)	
5.2 Check for leaks	
5.3 Check Display for proper operation	
5.4 Clean area and equipment as needed	

8.2 Daily Maintenance Procedures

8.2.1 Check Printer Paper Supply

Check printer paper roll.

- A colored warning stripe is visible when roll is near its end.
- See *SECTION 8.5.1, CHANGE PRINTER PAPER ROLL*, if a new paper roll is needed.

8.2.2 Clean Chamber Drain Strainer

WARNING – BURN HAZARD: Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.

Important: The chamber drain strainer must be cleaned at least once a day, preferably before running the first cycle.

1. Remove the drain strainer from the drain in the bottom of the chamber as shown in Figure 8-1.
2. Remove any obvious debris from the strainer. If necessary, clear the screen in the strainer using a brush, wire or similar tool.
3. Once it has been cleared of obvious debris, reverse flush the strainer under running water.
4. Replace the strainer in the chamber drain.

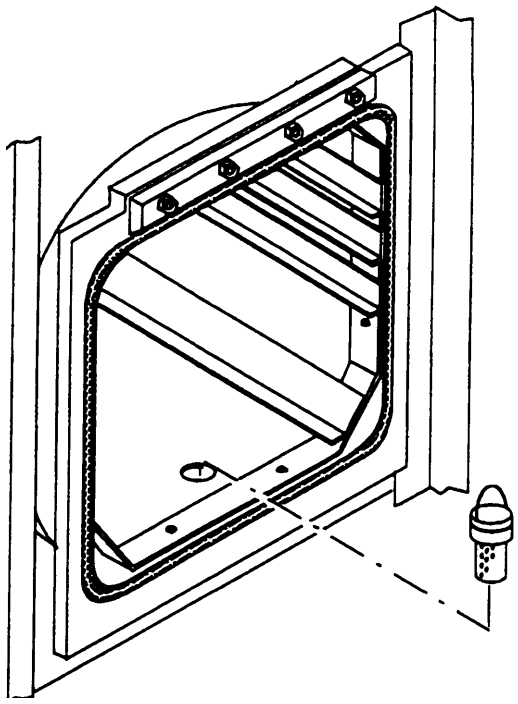


Figure 8-1. Remove Chamber Drain Strainer

8.3 Weekly Maintenance Procedure: Flush Chamber Drain

WARNING – BURN HAZARD: Allow sterilizer and accessories to cool to room temperature before performing any cleaning or maintenance procedures.

Flush chamber drain as follows whenever the line becomes clogged:

1. Turn off steam supply valve. Wait until jacket pressure is zero. Wait until chamber has cooled to room temperature.
2. Remove chamber drain strainer (Figure 8-1). Clean strainer using procedures given *SECTION 8.2.2*, if necessary.
3. Pour a solution of 60 mL (1/4 cup) of Liqui-Jet 2 Instrument Detergent (Contact your local STERIS representative), and 500 mL (1 pint) of hot water into the drain. Solution may puddle in the bottom of the chamber.

   Should the detergents in **Step 3** be unavailable, you may use a hot solution of 15mL (1 tablespoon) of trisodium phosphate to 500 mL (1 pint) of hot water.
4. Open door and place strainer back in drain.

8.4 Chamber Cleaning

Due to differences in water quality, steam quality, frequency of use and boiler additives, no specific frequency interval is recommended for chamber cleaning. Operators must determine appropriate cleaning interval based on the local water conditions and chamber appearance.

Chamber cleaning should be performed:

- When spills or other soiling have occurred in the chamber
- Periodically to maintain sterilizer cleanliness and appearance
- When processing materials that may be detrimental to the sterilizer (e.g., chloride-containing substances)

WARNING – SLIPPING HAZARD: To prevent falls, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading and unloading areas.

WARNING – BURN HAZARD: Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.

1. If applicable, the shelf assembly must be removed before cleaning the chamber.

Single Door

a. Remove shelves from rack.

b. Use an $^{1}/_{8}$" hex wrench to loosen (but not remove) the set screws at the front of the rack assembly.

c. Remove the rack assembly from the chamber.

Double Door

a. Remove shelves from rack.

b. Use an $^{1}/_{8}$" hex wrench to loosen (but not remove) the set screws at each end of the rack assembly.

c. Remove the rack assembly from the chamber.

Important: Chamber must be at room temperature, sterilizer off for approximately 12 hours, before washing. Open the chamber emergency manual exhaust valve. See Figure 5-11 (page 5-15) for valve location.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Lifting the chamber float switch when cleaning the chamber may cause the sterilizer control to initiate a "Chamber Flooded" alarm. If this alarm condition occurs, the operator must turn the control power OFF then ON to clear the alarm. The control power switch is located in the mechanical area at the side of the sterilizer. Placing the sterilizer in standby does not clear this alarm.**
- **Never use a wire brush, abrasives, or steel wool on door and chamber assembly. Do not use cleaners containing chloride on stainless-steel surfaces. Chloride-based cleaners will deteriorate stainless steel, eventually leading to failure of the vessel.**

2. Wash the inside of the chamber and shelf assembly (plus any other loading equipment) with a mild detergent solution such as Liquid-Jet 2 Instrument Detergent or current equivalent product. (Contact STERIS.)
3. Once the chamber is clean, replace the shelf assembly using the reverse of the appropriate procedure given in **Step 1**. Close the chamber emergency manual exhaust valve.
4. Professional cleaning of the chamber on a yearly basis (or as local conditions require) is suggested to maintain appearance of the chamber interior. Contact STERIS for information regarding this service.

8.5 Printer Maintenance

Materials Required:

- Paper Roll (P129362-819)
- Printer Ribbon (P150828-440)

AMSCO C Series sterilizer users see *SECTION 8.5, PRINTER MAINTENANCE*.

8.5.1 Change Printer Paper Roll

The printer paper roll should be changed whenever a colored stripe is visible on one or both edges of the printout paper.

1. Tear paper between take-up spool and printer.

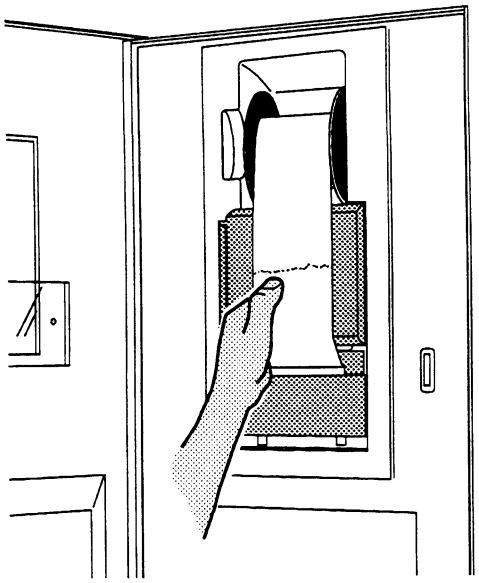


Figure 8-2. Tear Paper in Printer

2. Remove take-up spool from drive by inserting fingers in cavity as shown and pushing spool to the right.

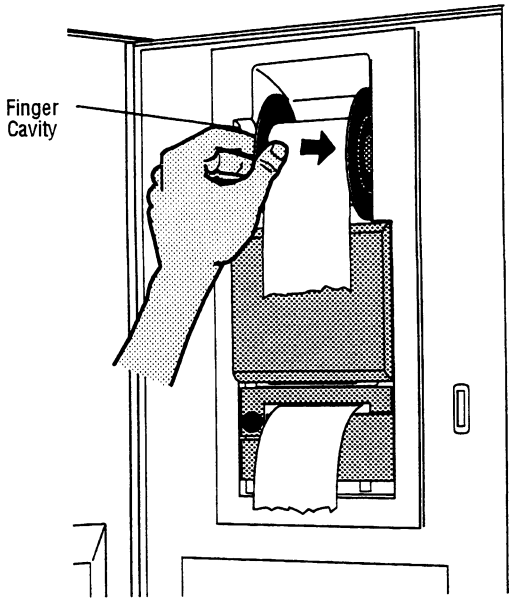


Figure 8-3. Remove Take Up Spool

3. Pull off right end of spool and remove used paper roll from spindle.

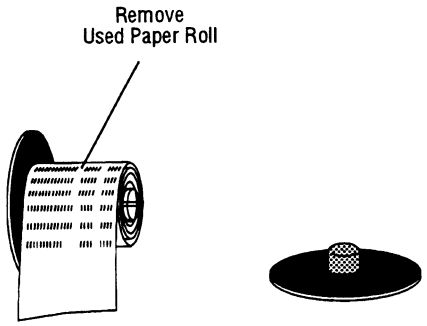


Figure 8-4. Remove Paper From Spool

4. Open access door and remove previous paper roll, gently pulling any remaining paper up and out of printer.

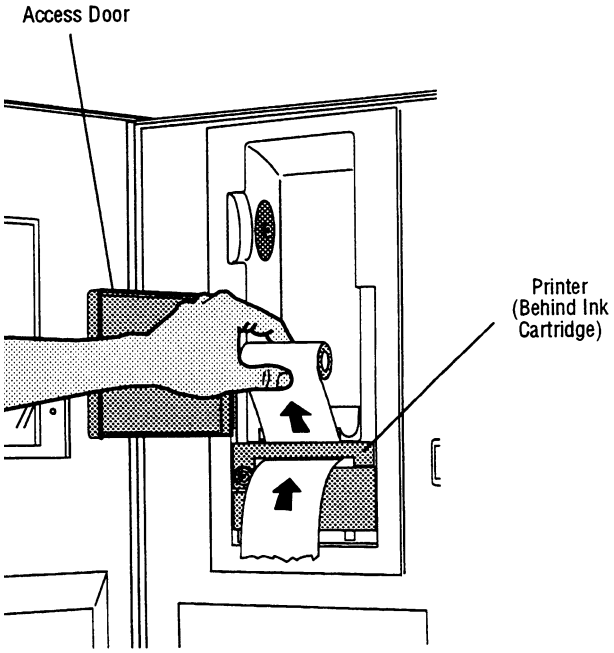


Figure 8-5. Remove Remaining Previous Paper

5. Insert new paper roll.

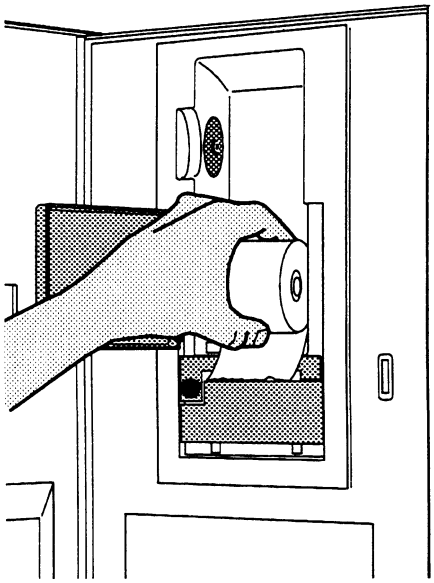


Figure 8-6. Insert New Paper Roll

6. Insert end of paper into printer slot just behind ink cartridge.

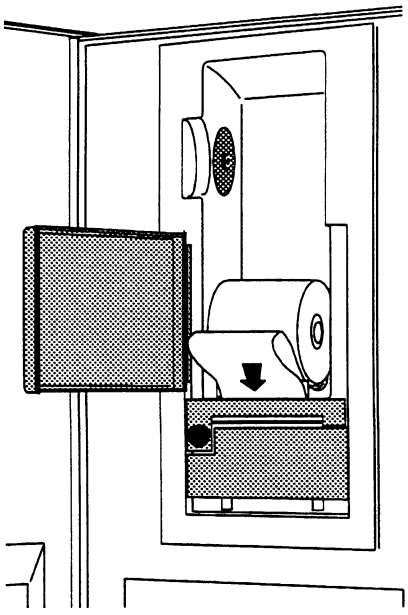


Figure 8-7. Insert Paper Through Printer Slot

7. Press PAPER FEED touch-screen pad on display until paper advances through printer and ink cartridge, exiting the front.

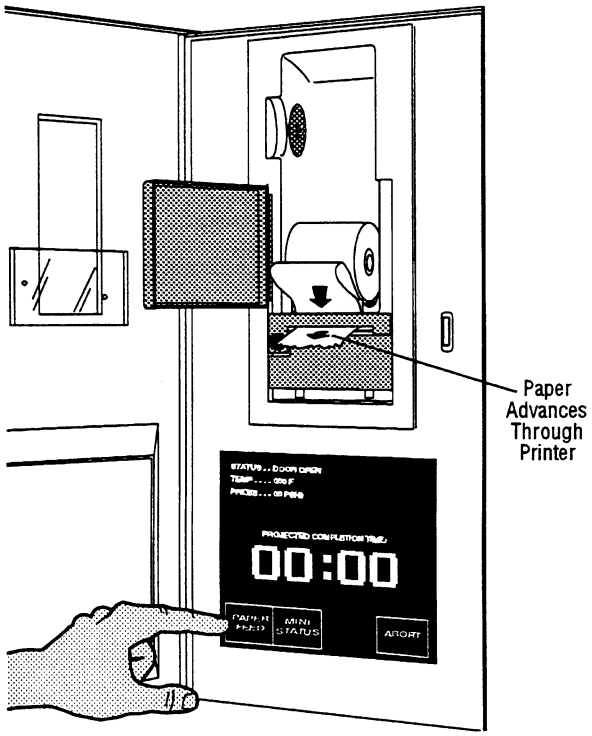


Figure 8-8. Press Paper Feed Touch Screen Button

8. Continue pressing PAPER FEED (or pull paper gently) until about 18” (46cm) of paper hangs out of printer. Insert end of paper into slot of take-up spool, then replace right end of spool.

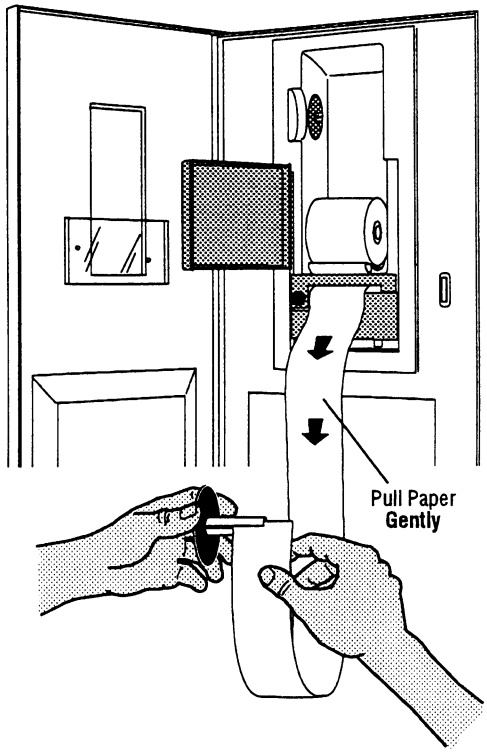


Figure 8-9. Insert Paper Into Take Up Spool

9. Rotate spool in direction shown until paper is secure.

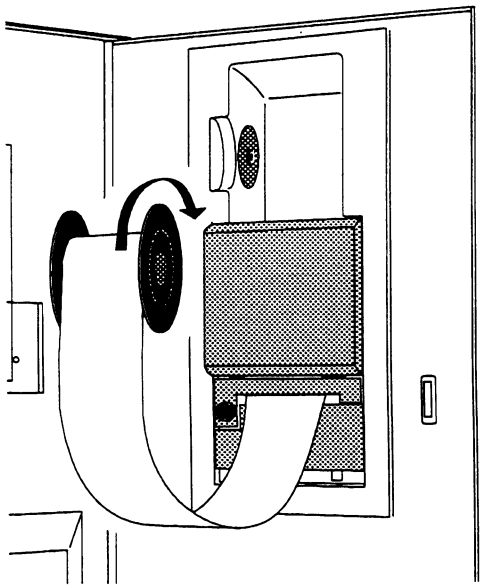


Figure 8-10. Rotate to Secure Paper on Spool

10. Reinstall take-up spool on magnetic idler. Manually roll up slack paper.

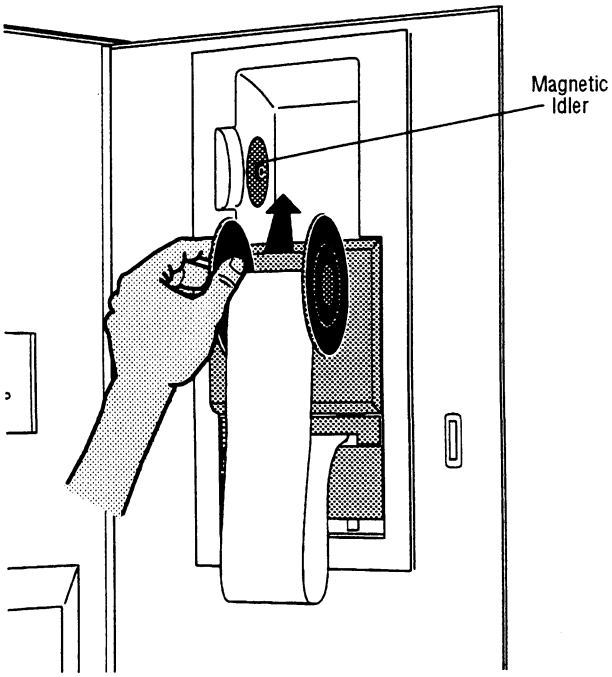


Figure 8-11. Reinstall Take Up Spool

8.5.2 Change Printer Ink Cartridge

The printer ink cartridge should be changed as soon as the type on printouts is light or faded, and before printouts become difficult to read.

1. Tear paper between take-up spool and printer.

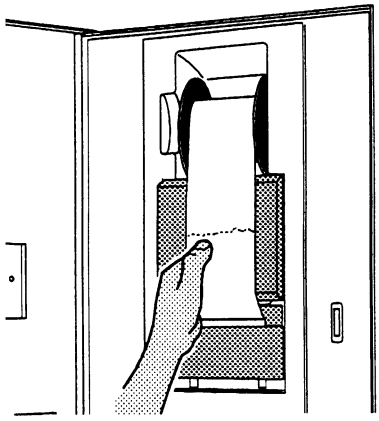


Figure 8-12. Tear Paper

2. Open access door, then press on right end of ink cartridge, until left end of cartridge pops out of the printer.

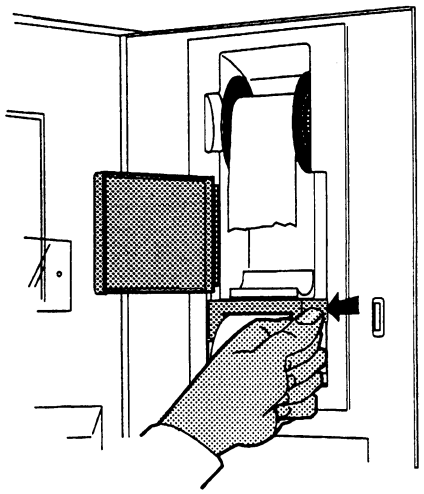


Figure 8-13. Press On End of Cartridge

3. Slip cartridge off end of paper. Slip new cartridge over paper in the same way as before, making sure paper slides between ink cartridge housing and ink ribbon.

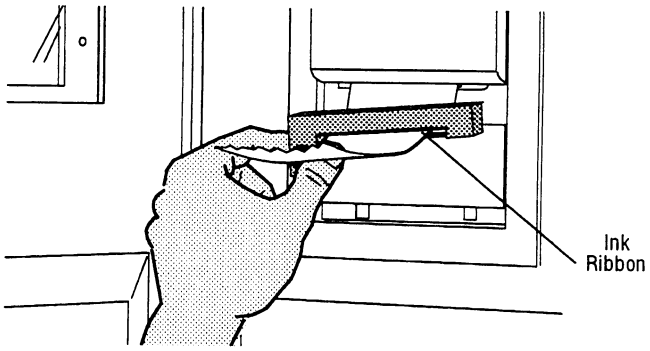


Figure 8-14. Remove Cartridge

4. Install left end of cartridge first, then push right end in as shown, snapping it into place.

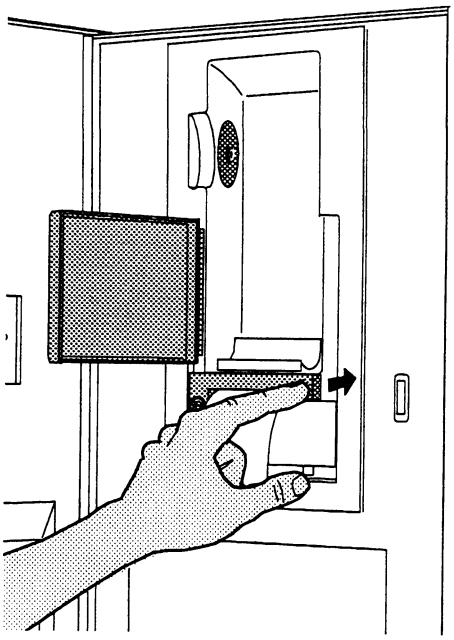


Figure 8-15. Press New Cartridge Into Place

5. Retighten ribbon by rotating wheel on left side of cartridge 1/4 turn. Then see *SECTION 8.5.1, CHANGE PRINTER PAPER ROLL*, Steps 8 through 10 to reinstall take-up spool.

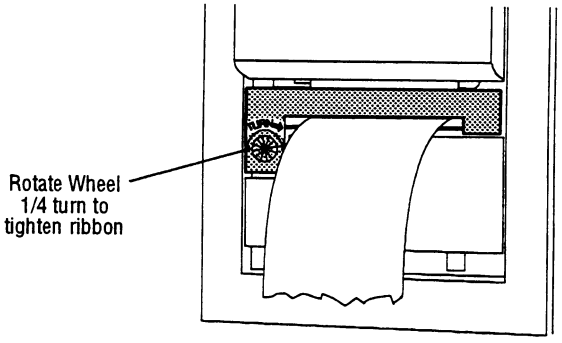


Figure 8-16. Tighten Cartridge Ribbon

TROUBLESHOOTING

9

9.1 General

WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury or result in costly equipment damage.

WARNING – SHOCK HAZARD: Disconnect all utilities to sterilizer before servicing. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.

WARNING – BURN HAZARD: Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.

This section pictorially lists and describes all the possible alarm conditions which may occur when operating the AMSCO® C Series Small Steam Sterilizer.

If a problem occurs that is not described in this section, please call STERIS Corporation. A trained service technician will promptly place your sterilizer in proper working condition.

NOTE: *Never permit unqualified persons to service the sterilizer.*

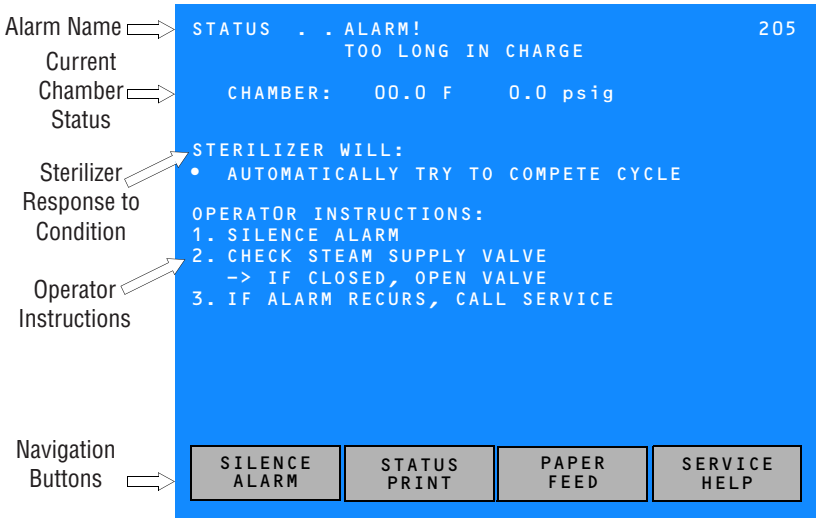


Figure 9-1. Typical Alarm Screen

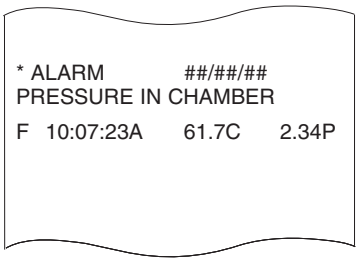
When an alarm condition occurs, the alarm tone sounds and the touch screen automatically displays the corresponding alarm screen. Typically, each alarm screen indicates the alarm name, current chamber status, current sterilizer activity and operator instructions (see Figure 9-1).

9.1.1 Typical Alarm Screen

Touch-screen pads, located along bottom of alarm screen, are used to perform the following functions:

- Pressing **SILENCE ALARM** turns off the alarm tone.
- Pressing **STATUS PRINT** generates a printout of the current temperature and pressure in the sterilizer chamber at the time the touchpad was pressed.
- Pressing **PAPER FEED** advances the printer paper up by one line.
- Pressing **SERVICE HELP** advances display to the corresponding service information screen. This screen provides the qualified service technician with possible causes and advanced corrective actions for that alarm condition.

Important: In the event of an alarm condition, the operator should always follow the instructions indicated on the alarm screen.



Full Print Format Shown

Figure 9-2. Typical Alarm Printout

9.1.2 Typical Alarm Printout

When an alarm occurs the printer automatically generates a printout, typically listing alarm name, time alarm occurred, current chamber status and any associated sensor temperature. See Figure 9-2.

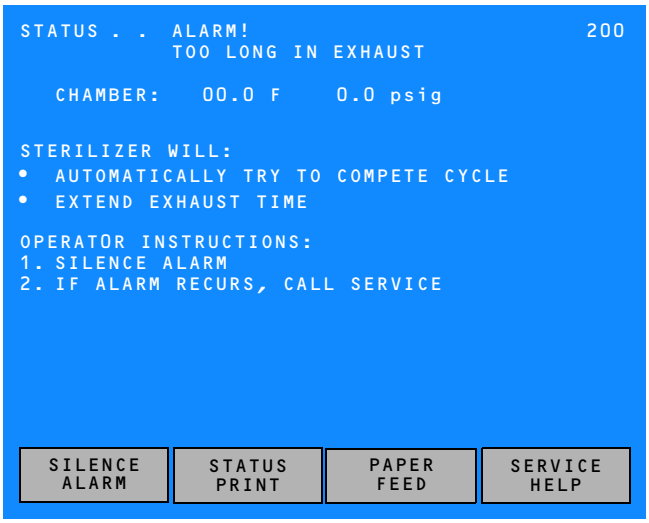
9.2 In-Cycle Alarms

The following alarm screens appear only during cycle operation:

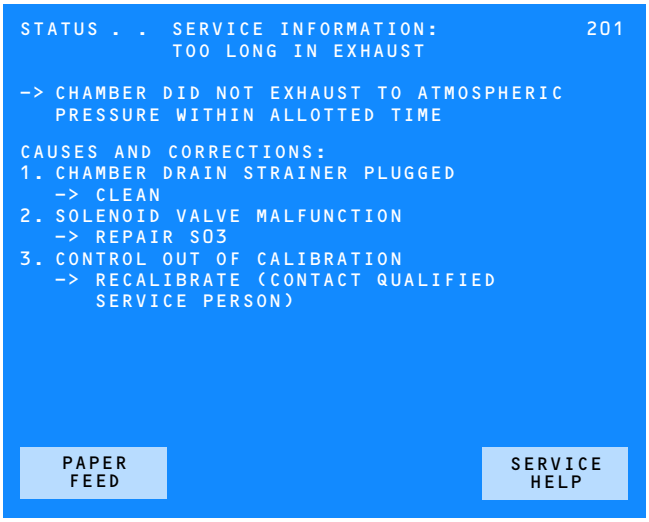
Alarm	Description	Screen with Operator Instructions
9.2.1 Too Long In Charge	Occurs if chamber does not reach the set temperature within the allotted time.	STATUS . . ALARM! 205 TOO LONG IN CHARGE CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • AUTOMATICALLY TRY TO COMPETE CYCLE OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CHECK STEAM SUPPLY VALVE -> IF CLOSED, OPEN VALVE 3. IF ALARM RECURS, CALL SERVICE SILENCE ALARM | STATUS PRINT | PAPER FEED | SERVICE HELP
		Screen with Service Instructions
		STATUS . . SERVICE INFORMATION: 206 TOO LONG IN CHARGE -> CHAMBER DID NOT REACH STERILIZE TEMPERATURE WITHIN ALLOTTED TIME CAUSES AND CORRECTIONS: 1. STEAM PRESSURE LESS THAN 50 PSIG -> CHECK STEAM SUPPLY PIPING 2. STEAM REGULATOR MALFUNCTION -> REPAIR 3. SOLENOID VALVE MALFUNCTION -> REPAIR SO9 -> REPAIR SO2 4. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) SERVICE MODE | ABORT | EXIT
Alarm	**Description**	**Screen with Operator Instructions**

9.2.2 Too Long In Exhaust

Occurs if chamber does not exhaust to 4 psig within the allotted time.



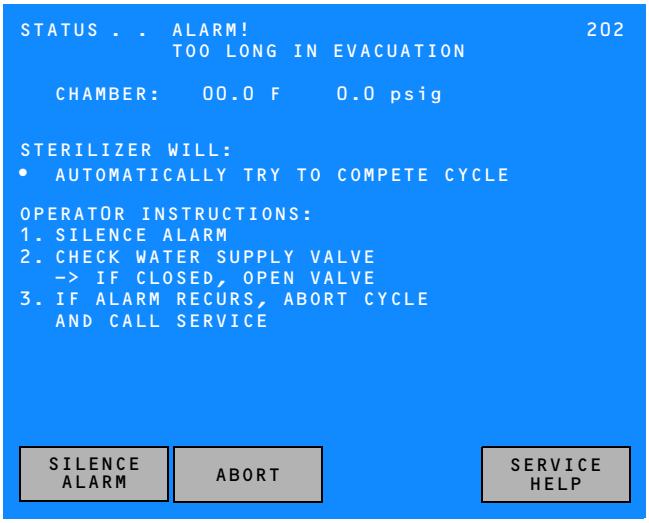
Screen with Service Instructions

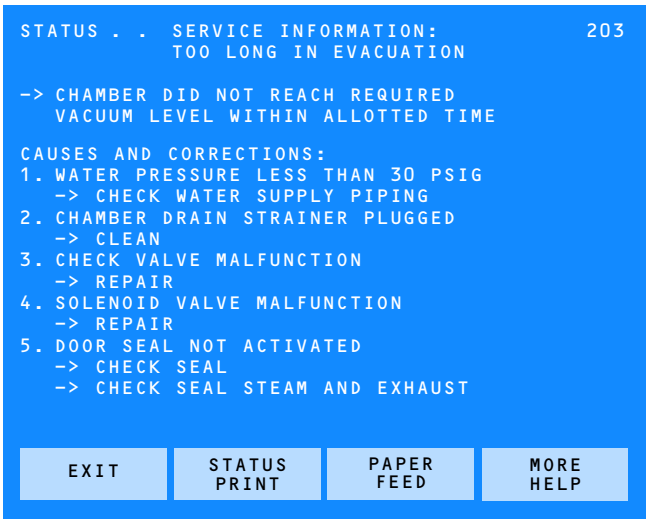
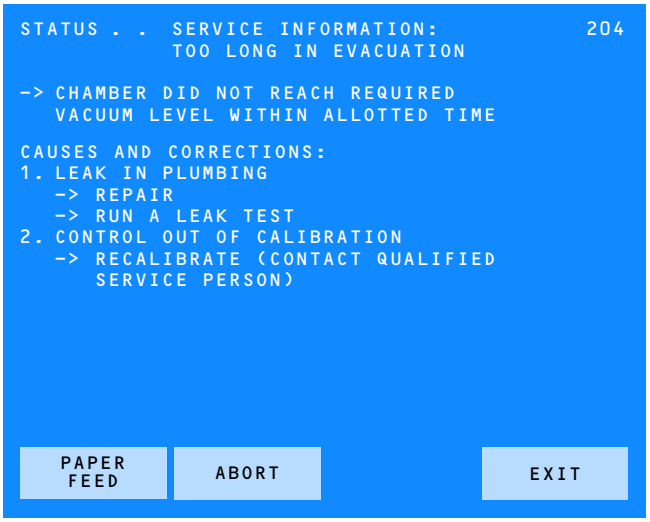
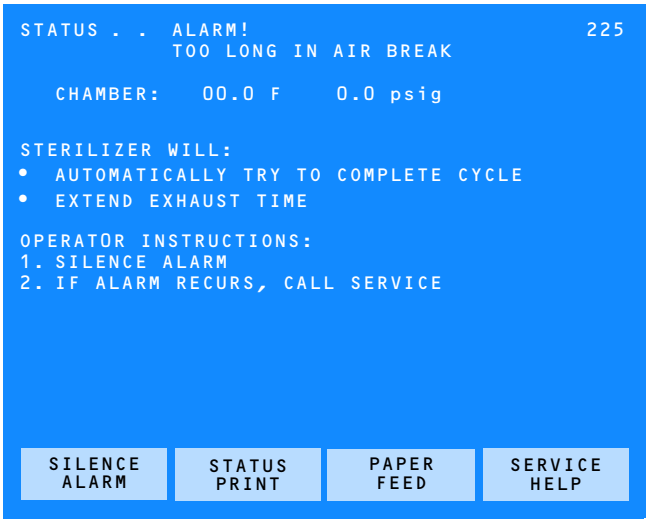


9.2.3 Too Long In Evacuation

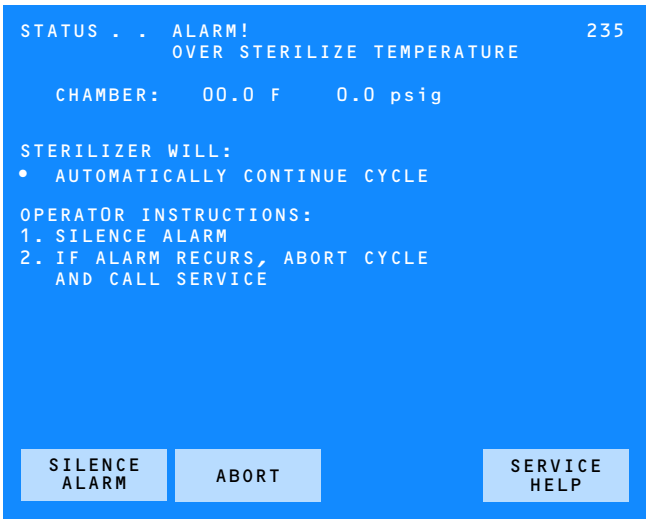
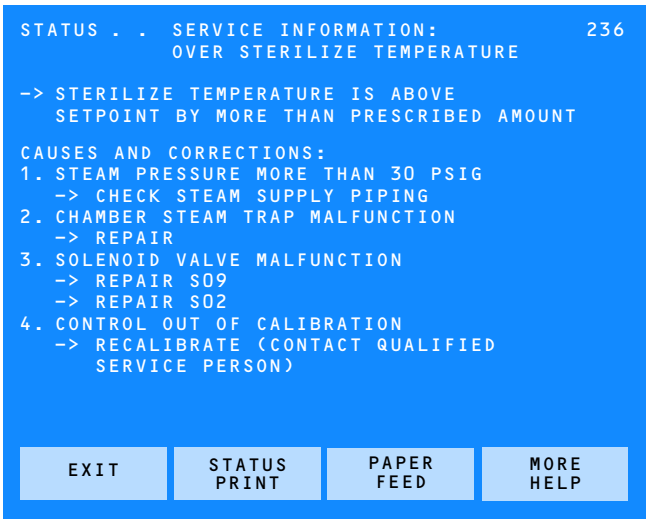
Occurs if chamber does not reach the set evacuation level within the allotted time.

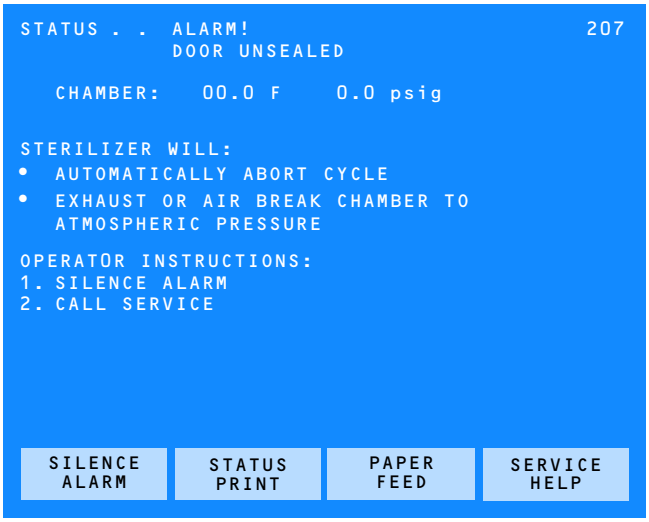
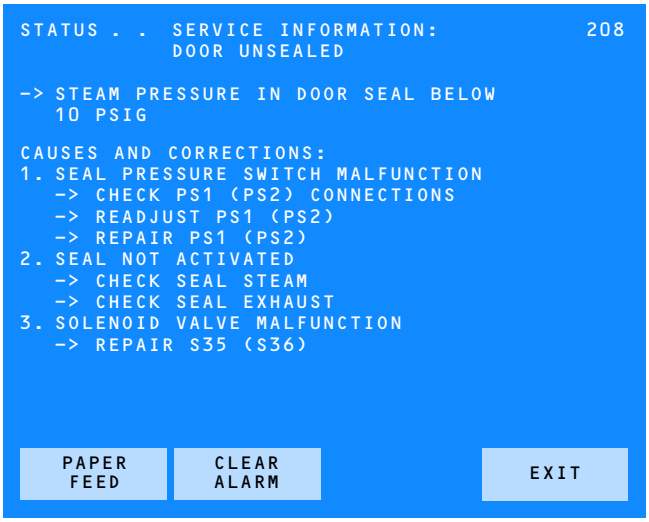
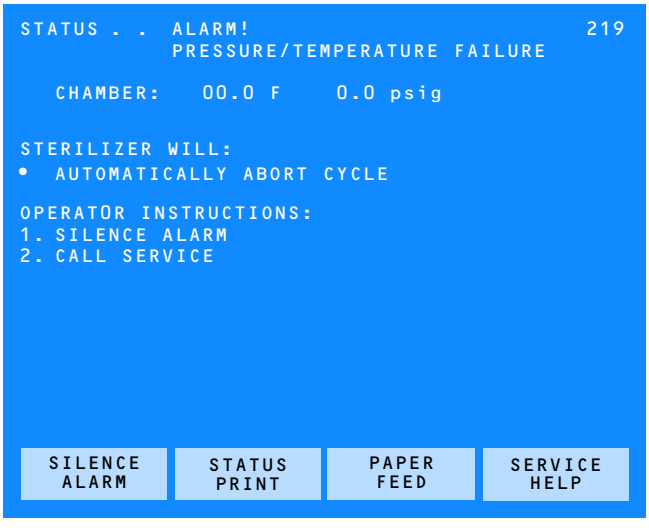
Screen with Operator Instructions



Alarm	Description	Screen with Service Instructions
Too Long In Evacuation (Continued)	*NOTE: This alarm has two service help screens.*	 
9.2.4 Too Long In Air Break	Occurs if chamber does not air break the vacuum to 2 inHg within the allotted time.	**Screen with Operator Instructions** 

Alarm	Description	Screen with Service Instructions
Too Long In Air Break (Continued)		STATUS . . SERVICE INFORMATION: 226 TOO LONG IN AIR BREAK -> CHAMBER DID NOT AIR BREAK VACUUM TO 1 PSIG WITHIN ALLOTTED TIME CAUSES AND CORRECTIONS: 1. AIR INLET FILTER PLUGGED -> REPAIR 2. SOLENOID VALVE MALFUNCTION -> REPAIR SO1 3. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) PAPER FEED EXIT
9.2.5 Under Sterilize Temperature	Occurs if chamber temperature drops below sterilize temperature.	**Screen with Operator Instructions** STATUS . . ALARM! 223 UNDER STERILIZE TEMPERATURE CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • AUTOMATICALLY RESTART STERILIZE TIME AND CONTINUE CYCLE AFTER SET TEMP. IS REACHED OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. IF ALARM RECURS, CALL SERVICE SILENCE ALARM STATUS PRINT PAPER FEED SERVICE HELP **Screen with Service Instructions** STATUS . . SERVICE INFORMATION: 224 UNDER STERILIZE TEMPERATURE -> CHAMBER TEMPERATURE DROPPED BELOW STERILIZE TEMPERATURE BY UNDERTEMP TEMPERATURE VALUE CAUSES AND CORRECTIONS: 1. STEAM PRESSURE LESS THAN 50 PSIG -> CHECK STEAM SUPPLY PIPING 2. CHAMBER STEAM TRAP MALFUNCTION -> REPAIR 3. SOLENOID VALVE MALFUNCTION -> REPAIR SO9 -> REPAIR SO2 4. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) PAPER FEED EXIT

Alarm	Description	Screen with Operator Instructions
9.2.6 Over Sterilize Temperature ***NOTE:*** *The control temperature is the value the sterilizer maintains during the sterilize phase. This value is 2°F above the cycle sterilize temperature set point. The over temperature value is added to the control temperature value to arrive at the temperature which causes this cycle alarm.*	Occurs if chamber temperature exceeds the maximum sterilize temperature (Control temperature + over-temperature value).	 **Screen with Service Instructions** 

Alarm	Description	Screen with Operator Instructions
9.2.7 Door Unsealed	Occurs if steam pressure in door seal drops below 5 psig.	
		Screen with Service Instructions 
9.2.8 Chamber Pressure/Temperature Failure	Occurs if chamber pressure or temperature readings are outside the normal steam range during sterilize phase.	**Screen with Operator Instructions** 

Alarm	Description	Screen with Service Instructions
Chamber Pressure/ Temperature Failure (Continued)		STATUS . . SERVICE INFORMATION: 220 PRESSURE/TEMPERATURE FAILURE -> PRESSURE OR TEMPERATURE OUTSIDE NORMAL STEAM RANGE CAUSES AND CORRECTIONS: 1. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) 2. TRANSDUCER, CP, MALFUNCTION -> REPAIR 3. RTD PROBE, CT, MALFUNCTION -> REPAIR 4. MAIN CONTROL FAILURE -> CHECK CONTROL BOARD POWER STATUS LEDs -> REPLACE 146659-065 CONTROL BOARD -> RECALIBRATE PAPER FEED / SERVICE MODE / EXIT

Alarm	Description	Screen with Operator Instructions
9.2.9 Exhaust Rate Too Fast	Occurs if liquid cycle slow exhaust rate is too fast.	STATUS . . ALARM! 241 EXHAUST RATE TOO FAST CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • AUTOMATICALLY TRY TO COMPLETE CYCLE • TRY TO EXHAUST CHAMBER ACCORDING TO OPTIMAL COOLING RATE OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. IF ALARM RECURS, CALL SERVICE SILENCE ALARM / STATUS PRINT / PAPER FEED / SERVICE HELP

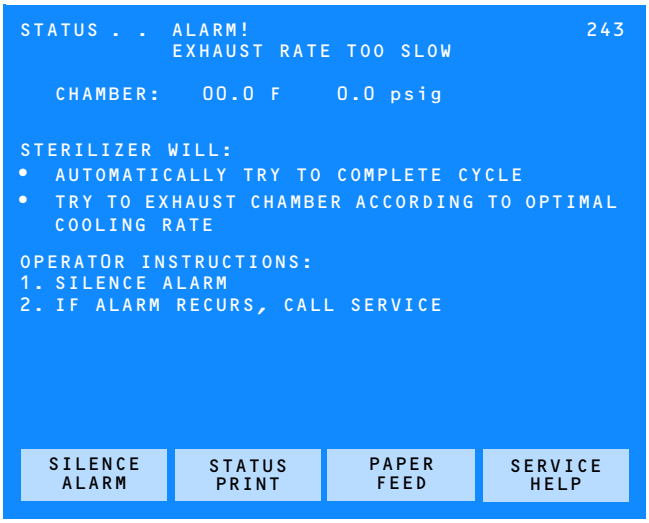
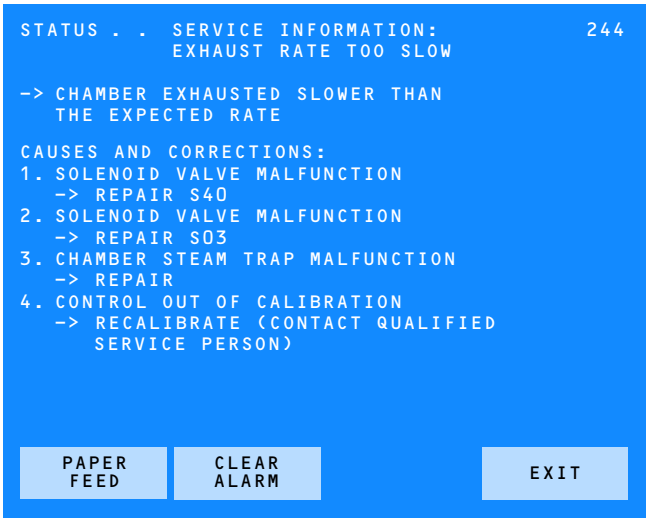
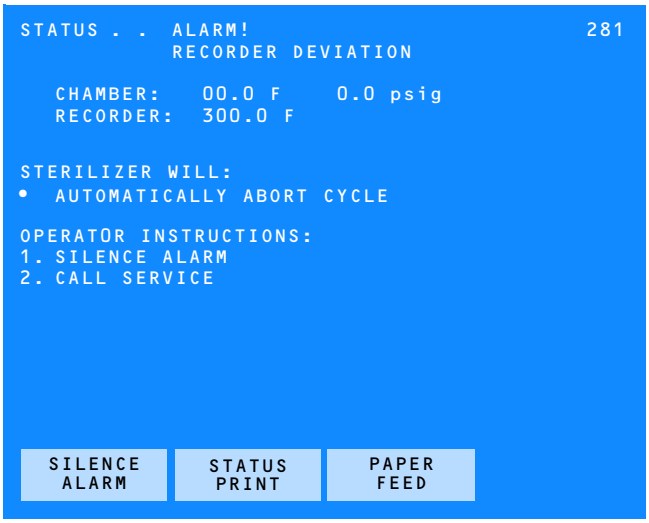
Screen with Service Instructions

STATUS . . SERVICE INFORMATION: 242
EXHAUST RATE TOO FAST

-> CHAMBER EXHAUSTED SLOWER THAN
THE EXPECTED RATE

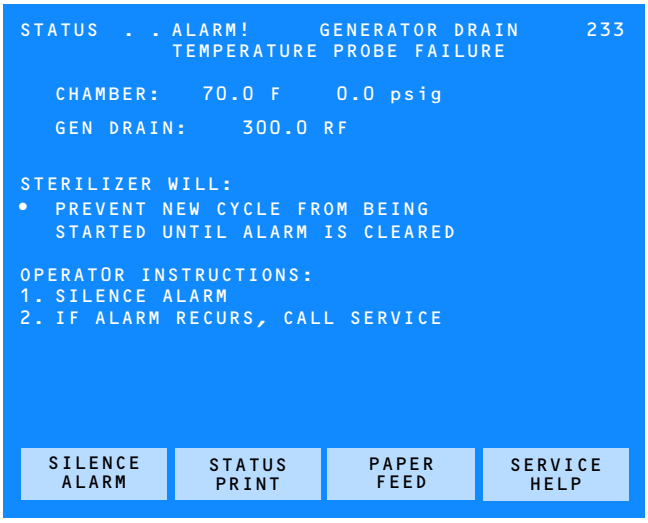
CAUSES AND CORRECTIONS:
1. SOLENOID VALVE MALFUNCTION
-> REPAIR S40
2. SOLENOID VALVE MALFUNCTION
-> REPAIR S03
3. CHAMBER STEAM TRAP MALFUNCTION
-> REPAIR
4. CONTROL OUT OF CALIBRATION
-> RECALIBRATE (CONTACT QUALIFIED
SERVICE PERSON)

PAPER FEED / CLEAR ALARM / EXIT

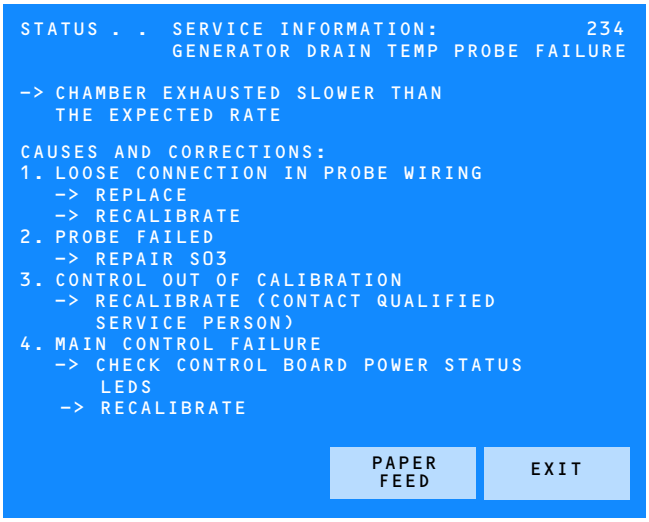
Alarm	Description	Screen with Operator Instructions
9.2.10 Exhaust Rate Too Slow	Occurs if liquid cycle exhaust rate is too slow.	
		Screen with Service Instructions
		
9.2.11 Recorder Deviation Alarm	Occurs if the two temperature sensing elements in the chamber drain probe read more than 1°F (0.5°C) apart.	**Screen with Operator Instructions**
		

9.2.12 Generator Drain Temperature Probe Failure Alarm

Screen with Operator Instructions

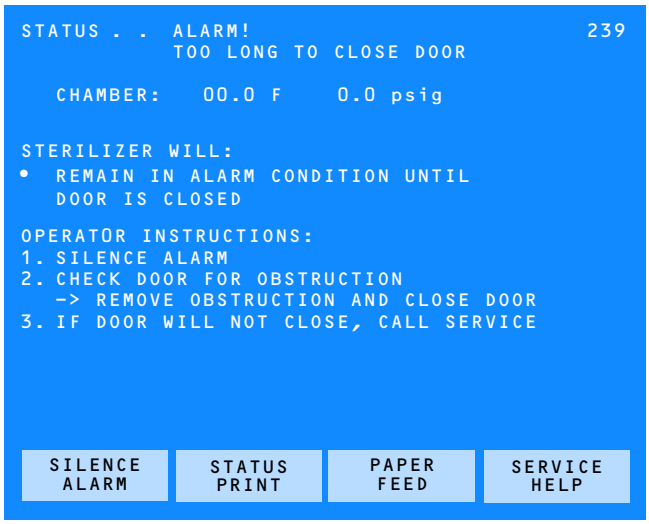


Screen with Service Instructions

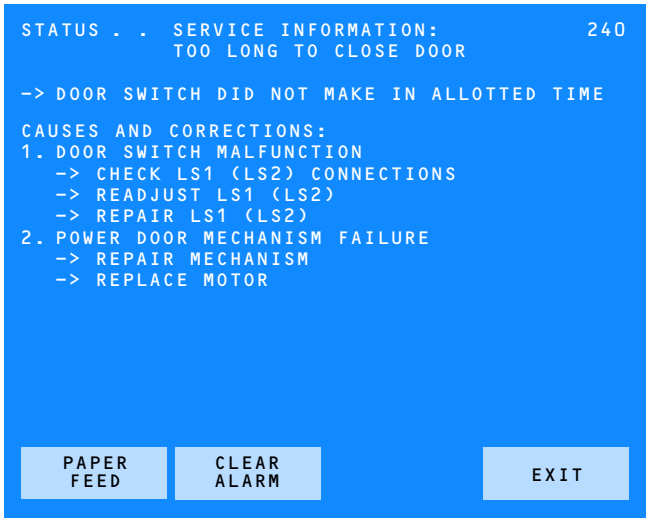

STATUS . . SERVICE INFORMATION: 234
GENERATOR DRAIN TEMP PROBE FAILURE
-> CHAMBER EXHAUSTED SLOWER THAN THE EXPECTED RATE
CAUSES AND CORRECTIONS:
1. LOOSE CONNECTION IN PROBE WIRING
-> REPLACE
-> RECALIBRATE
2. PROBE FAILED
-> REPAIR SO3
3. CONTROL OUT OF CALIBRATION
-> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON)
4. MAIN CONTROL FAILURE
-> CHECK CONTROL BOARD POWER STATUS LEDS
-> RECALIBRATE
PAPER FEED
EXIT

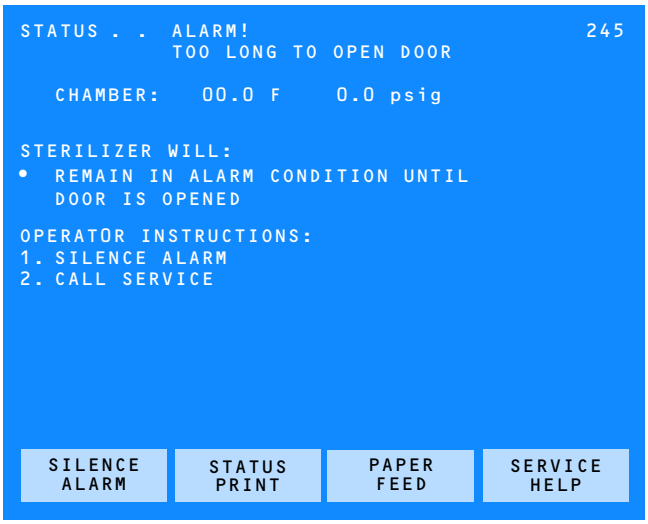
9.3 Out-of-Cycle Alarms

The following alarm screens will appear only when the sterilizer is **not processing** a cycle.

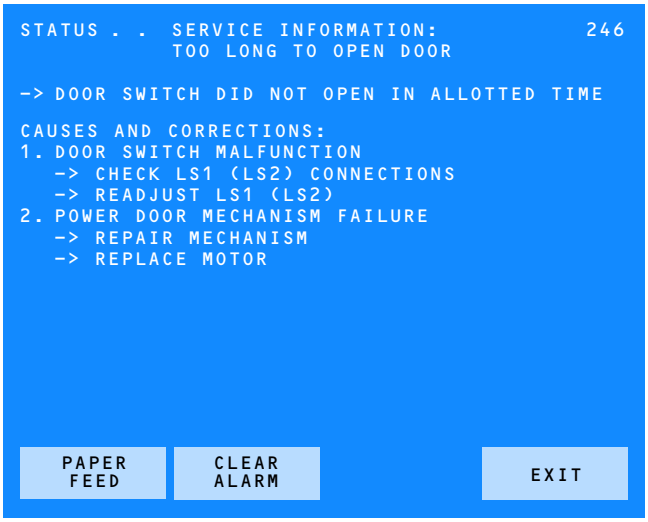
Alarm	Description	Screen with Operator Instructions
9.3.1 Too Long To Close Door	Occurs if door switch does not make contact within allotted time.	

Screen with Service Instructions



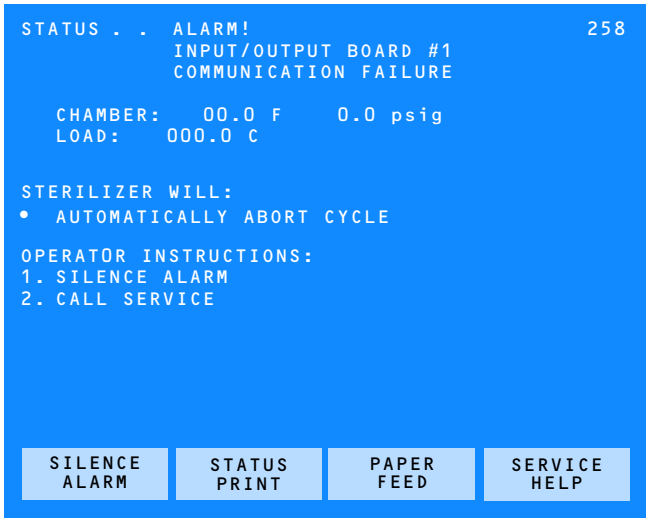
Alarm	Description	Screen with Operator Instructions
9.3.2 Too Long To Open Door	Occurs if door switch does not open within the allotted time.	

Screen with Service Instructions

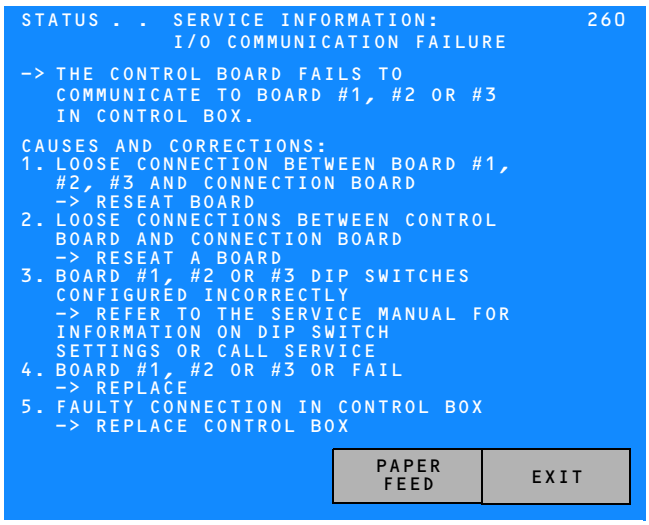


		Screen with Operator Instructions
9.3.3 Pressure In Chamber	Occurs if 2 psig pressure is sensed in the chamber.	STATUS . . ALARM! 221 PRESSURE IN CHAMBER CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • AUTOMATICALLY EXHAUST CHAMBER TO ATMOSPHERIC PRESSURE OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. IF ALARM RECURS, CALL SERVICE [SILENCE ALARM] [STATUS PRINT] [PAPER FEED] [SERVICE HELP]
		Screen with Service Instructions
		STATUS . . SERVICE INFORMATION: 222 PRESSURE IN CHAMBER -> 2 PSIG PRESSURE SENSED IN CHAMBER WHEN NOT IN CYCLE CAUSES AND CORRECTIONS: 1. SOLENOID VALVE MALFUNCTION -> REPAIR SO2 2. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) 3. TRANSDUCER, CP, MALFUNCTION -> REPAIR -> RECALIBRATE 4. MAIN CONTROL FAILURE -> CHECK CONTROL BOARD POWER STATUS LEDs -> REPLACE CONTROL BOARD -> RECALIBRATE [PAPER FEED] [EXIT]
		Screen with Operator Instructions
9.3.4 Waste Temperature Probe Failure	Occurs if waste line temperature reading is outside the normal range of 32 - 293°F (0 - 145°C)	STATUS . . ALARM! 215 WASTE TEMPERATURE PROBE FAILURE CHAMBER: 00.0 F 0.0 psig WASTE: 00.0 F STERILIZER WILL: • PREVENT NEW CYCLE FROM BEING STARTED UNTIL ALARM IS CLEARED OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CALL SERVICE [SILENCE ALARM] [STATUS PRINT] [PAPER FEED] [SERVICE HELP]

Alarm	Description	Screen with Service Instructions
Waste Temperature Probe Failure (Continued)		STATUS . . SERVICE INFORMATION: 216 -> RTD PROBE, WT, OUTPUT IS OUTSIDE NORMAL RANGE CAUSES AND CORRECTIONS: 1. LOOSE CONNECTION IN PROBE WIRING -> REPAIR 2. PROBE FAILED -> REPLACE -> RECALIBRATE 3. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) 4. MAIN CONTROL FAILURE -> CHECK CONTROL BOARD POWER STATUS LEDs -> REPLACE CONTROL BOARD PAPER FEED EXIT
9.3.5 Atmospheric Pressure Alarm	Occurs if atmospheric pressure is greater than 1 psi from the calibrated atmospheric pressure.	**Screen with Operator Instructions** STATUS . . ALARM! 269 ATMOSPHERIC PRESSURE ALARM CHAMBER: 00.0 F 0.0 psig ALTITUDE SETTING: 0 TO 1000 FEET OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CALL SERVICE SILENCE ALARM STATUS PRINT PAPER FEED SERVICE HELP **Screen with Service Instructions** STATUS . . SERVICE INFORMATION: 270 ATMOSPHERIC PRESSURE ALARM -> THE ATMOSPHERIC PRESSURE IS GREATER THAN 1 PSI FROM THE CALIBRATED ATMOSPHERIC PRESSURE CAUSES AND CORRECTIONS: 1. THE STERILIZER IS AT A HIGHER ALTITUDE THEN WHERE IT WAS ORIGINALLY CALIBRATED (FACTORY) -> SET ALTITUDE 2. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) 3. LOOSE CONNECTION IN TRANSDUCER WIRING -> REPAIR 4. TRANSDUCER FAILED -> REPLACE -> RECALIBRATE CLEAR ALARM PAPER FEED EXIT

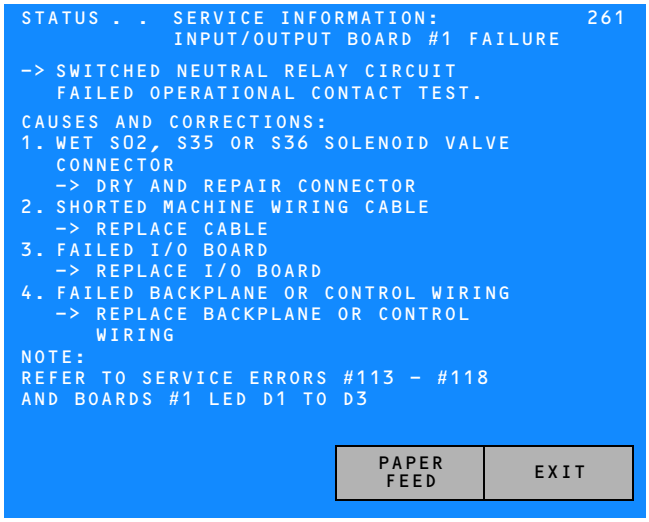
Alarm	Description	Screen with Operator Instructions
9.3.6 Input/Output Board #1 Communication Failure	The I/O board fails to achieve communication with board #1, #2 or #3 in the control box.	

Screen with Service Instructions

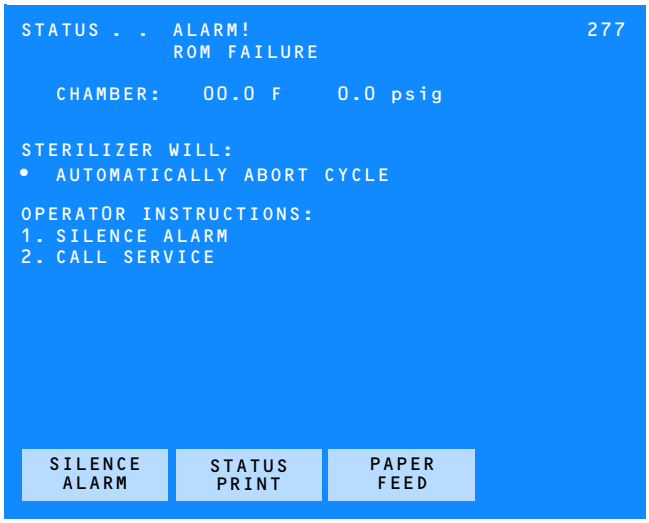


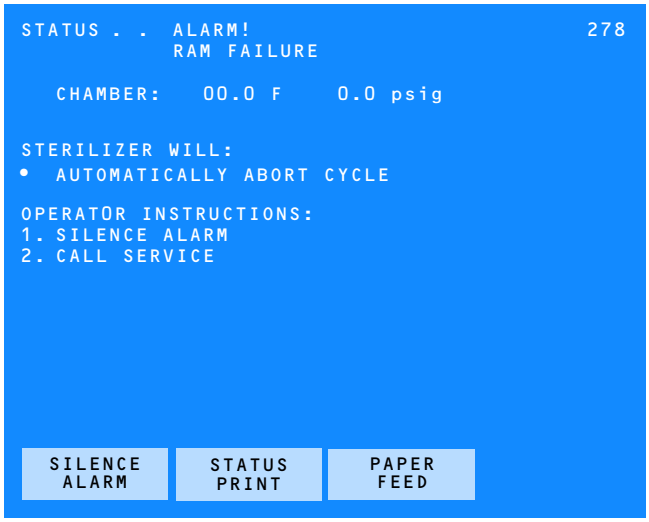
STATUS . . SERVICE INFORMATION: 260
I/O COMMUNICATION FAILURE
-> THE CONTROL BOARD FAILS TO COMMUNICATE TO BOARD #1, #2 OR #3 IN CONTROL BOX.
CAUSES AND CORRECTIONS:
1. LOOSE CONNECTION BETWEEN BOARD #1, #2, #3 AND CONNECTION BOARD
-> RESEAT BOARD
2. LOOSE CONNECTIONS BETWEEN CONTROL BOARD AND CONNECTION BOARD
-> RESEAT A BOARD
3. BOARD #1, #2 OR #3 DIP SWITCHES CONFIGURED INCORRECTLY
-> REFER TO THE SERVICE MANUAL FOR INFORMATION ON DIP SWITCH SETTINGS OR CALL SERVICE
4. BOARD #1, #2 OR #3 OR FAIL
-> REPLACE
5. FAULTY CONNECTION IN CONTROL BOX
-> REPLACE CONTROL BOX
PAPER FEED
EXIT

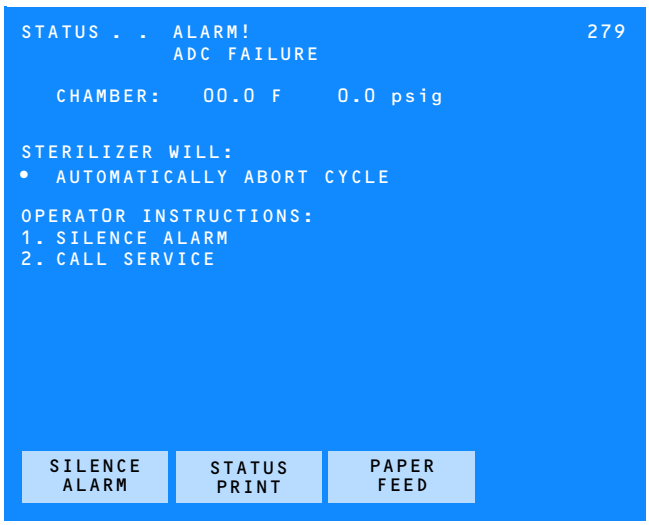
Screen with Service Instructions



STATUS . . SERVICE INFORMATION: 261
INPUT/OUTPUT BOARD #1 FAILURE
-> SWITCHED NEUTRAL RELAY CIRCUIT FAILED OPERATIONAL CONTACT TEST.
CAUSES AND CORRECTIONS:
1. WET SO2, S35 OR S36 SOLENOID VALVE CONNECTOR
-> DRY AND REPAIR CONNECTOR
2. SHORTED MACHINE WIRING CABLE
-> REPLACE CABLE
3. FAILED I/O BOARD
-> REPLACE I/O BOARD
4. FAILED BACKPLANE OR CONTROL WIRING
-> REPLACE BACKPLANE OR CONTROL WIRING
NOTE:
REFER TO SERVICE ERRORS #113 - #118 AND BOARDS #1 LED D1 TO D3
PAPER FEED
EXIT

Alarm	Description	Screen with Operator Instructions
9.3.7 ROM Failure	Occurs if the Read Only memory on the main control circuit board fails.	

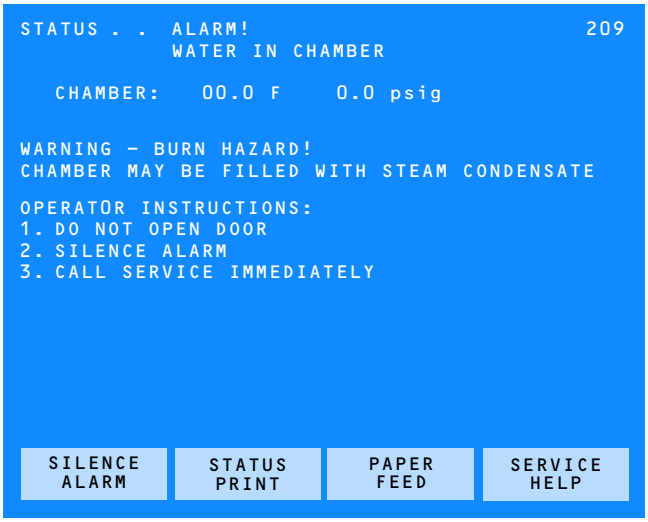
Alarm	Description	Screen with Operator Instructions
9.3.8 RAM Failure	Occurs if the Random Access memory on the main control circuit board fails.	

Alarm	Description	Screen with Operator Instructions
9.3.9 ADC Failure	Occurs if the Analog to Digital Board on the main control circuit board fails.	

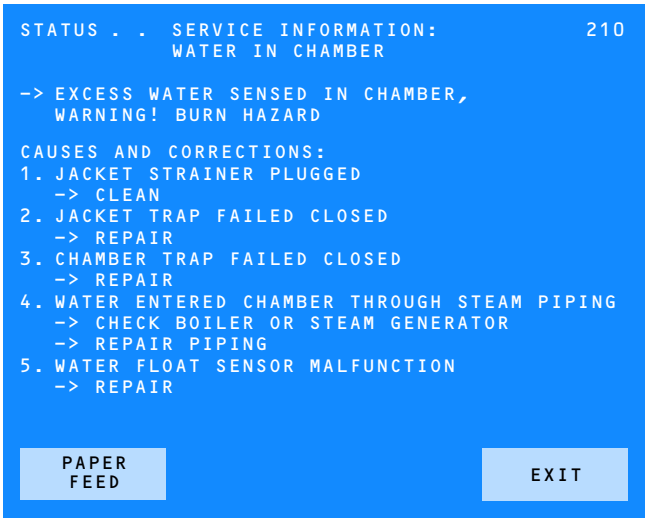
		Screen with Operator Instructions
9.3.10 Emergency Stop Switch Pressed	The emergency stop switch has been pressed.	STATUS . . ALARM! 273 EMERGENCY STOP SWITCH PRESSED CHAMBER: 300.0 F 0.0 psig STERILIZER WILL: • STOP OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CORRECT THE CAUSE FOR THE EMERGENCY STOP. 3. INSERT KEY AND TURN COUNTERCLOCKWISE TO RESET THE EMERGENCY STOP SWITCH 4. WAIT FOR THE CYCLE TO ABORT 5. RESTART THE CYCLE 6. CALL SERVICE IF ALARM DOES NOT CLEAR SILENCE ALARM | STATUS PRINT | PAPER FEED | SERVICE HELP
		Screen with Service Instructions
		STATUS . . ALARM! 274 EMERGENCY STOP SWITCH PRESSED -> NO 12OVQC POWER IS DETECTED ON I/O BOARD #1. CAUSES AND CORRECTIONS: 1. EMERGENCY STOP SWITCH PRESSED OF FAILED OPEN 2. OPEN WIRING TO CONTROL (P37 CABLE) 3. OPEN IN CONTROL WIRING TO J14 ON BACKPLANE 4. FAILED I/O BOARD #1 5. FAILED BACKPLANE PAPER FEED | EXIT

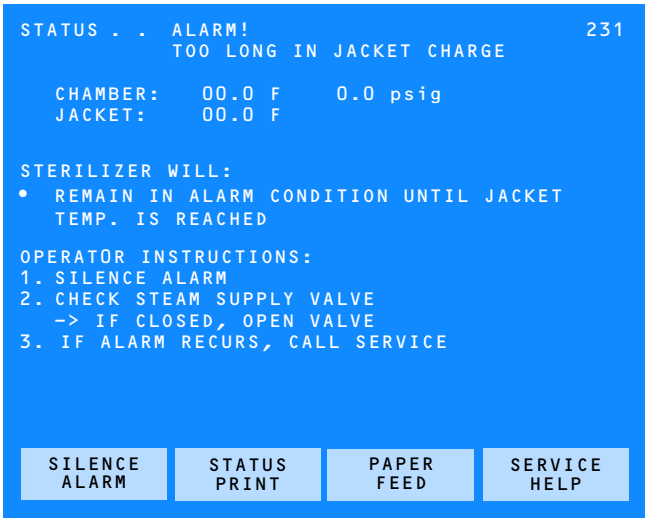
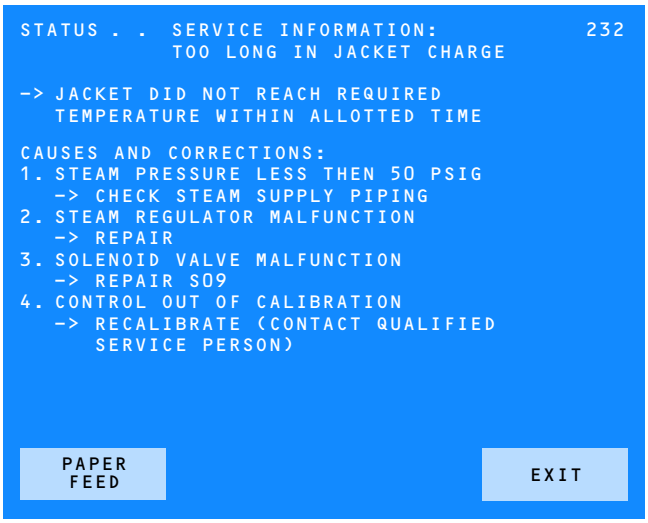
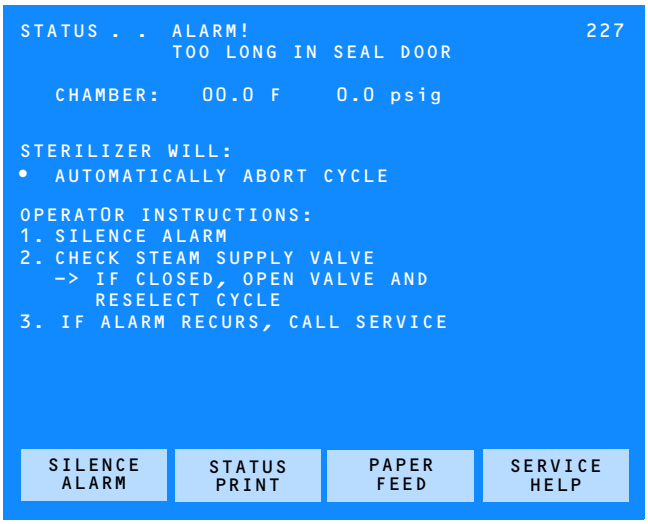
9.4 Sensor Alarms

The following alarm screens will appear (under alarm conditions) if the sterilizer is energized. The sensors are continually monitored whenever the sterilizer is in or out of cycle.

Alarm	Description	Screen with Operator Instructions
9.4.1 Water In Chamber	Occurs if excess water is sensed in the chamber.	

Screen with Service Instructions

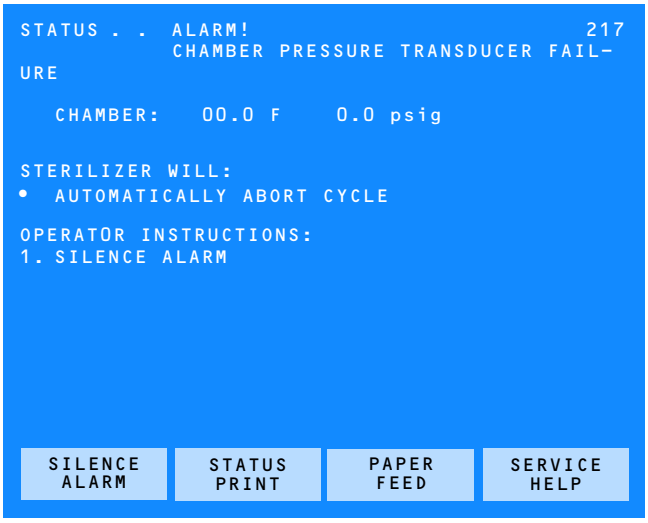
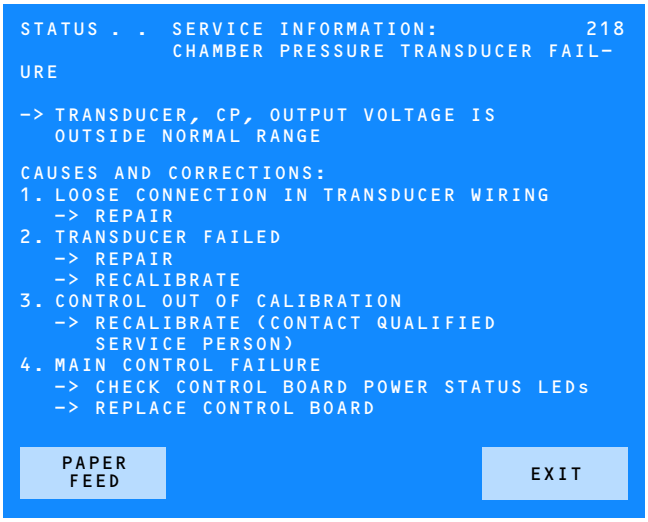


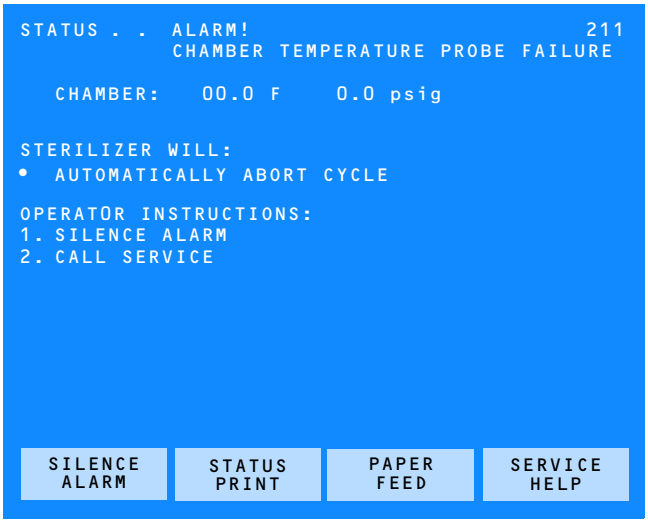
Alarm	Description	Screen with Operator Instructions
9.4.2 Too Long In Jacket Charge	Occurs if jacket does not reach set temperature within allotted time.	
		Screen with Service Instructions
		
Alarm	**Description**	**Screen with Operator Instructions**
9.4.3 Too Long To Seal Door	Occurs if door seal does not reach 5 psig within allotted time.	

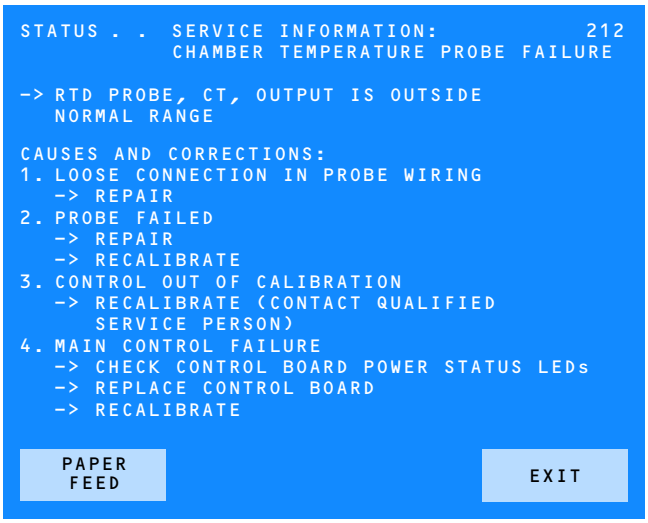
Alarm	Description	Screen with Service Instructions
Too Long To Seal Door (Continued)		STATUS . . SERVICE INFORMATION: 228 TOO LONG TO SEAL DOOR -> DOOR SEAL DID NOT REACH 10 PSIG WITHIN ALLOTTED TIME CAUSES AND CORRECTIONS: 1. SEAL PRESSURE SWITCH MALFUNCTION -> READJUST PS1 (PS2) -> REPAIR PS1 (PS2) 2. SEAL NOT ACTIVATING -> CHECK SEAL STEAM -> CHECK SEAL EXHAUST 3. SOLENOID VALVE MALFUNCTION -> REPAIR S35 (S36) PAPER FEED / CLEAR ALARM / EXIT

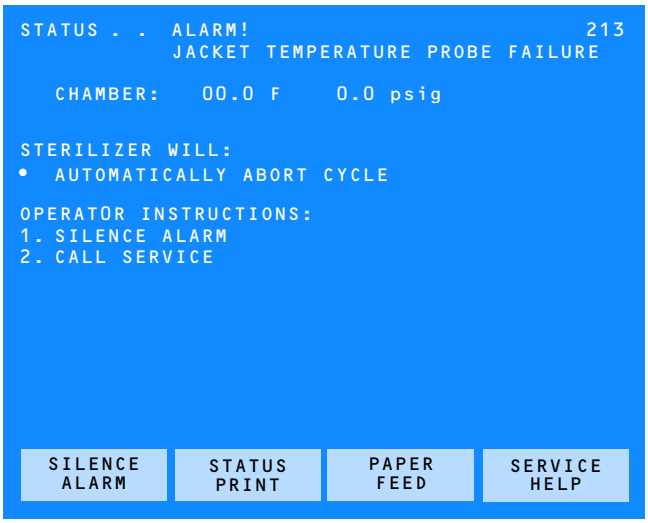
Alarm	Description	Screen with Operator Instructions
9.4.4 Too Long To Unseal Door	Occurs if door seal pressure does not drop below 5 psig within allotted time.	STATUS . . ALARM! 229 TOO LONG TO UNSEAL DOOR CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • REMAIN IN ALARM CONDITION UNTIL DOOR IS UNSEALED OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CALL SERVICE 3. IF LOAD MUST BE REMOVED, REFER TO EMERGENCY DOOR OPERATION PROCEDURE IN OPERATING MANUAL SILENCE ALARM / STATUS PRINT / PAPER FEED / SERVICE HELP

Screen with Service Instructions
STATUS . . SERVICE INFORMATION: 230 TOO LONG TO UNSEAL DOOR -> DOOR SEAL PRESSURE NOT BELOW 10 PSIG WITHIN ALLOTTED TIME CAUSES AND CORRECTIONS: 1. SEAL PRESSURE SWITCH MALFUNCTION -> READJUST PS1 (PS2) -> REPAIR PS1 (PS2) 2. SEAL NOT RETRACTING -> CHECK SEAL STEAM -> CHECK SEAL EXHAUST 3. SOLENOID VALVE MALFUNCTION -> REPAIR S37 (S38) -> REPAIR S35 (S36) PAPER FEED / EXIT

Alarm	Description	Screen with Operator Instructions
9.4.5 Chamber Pressure Transducer Failure	Occurs if chamber pressure reading is outside the normal range.	
		Screen with Service Instructions 

Alarm	Description	Screen with Operator Instructions
9.4.6 Chamber Temperature Probe Failure	Occurs if chamber temperature reading is outside the normal range.	

Alarm	Description	Screen with Service Instructions
Chamber Temperature Probe Failure (Continued)		

Alarm	Description	Screen with Operator Instructions
9.4.7 Jacket Temperature Probe Failure	Occurs if jacket temperature reading is outside the normal range.	

Alarm	Description	Screen with Service Instructions
Jacket Temperature Probe Failure (Continued)		STATUS . . SERVICE INFORMATION: 214 JACKET TEMPERATURE PROBE FAILURE -> RTD PROBE, JT, OUTPUT IS OUTSIDE NORMAL RANGE CAUSES AND CORRECTIONS: 1. LOOSE CONNECTION IN PROBE WIRING -> REPAIR 2. PROBE FAILED -> REPAIR -> RECALIBRATE 3. CONTROL OUT OF CALIBRATION -> RECALIBRATE (CONTACT QUALIFIED SERVICE PERSON) 4. MAIN CONTROL FAILURE -> CHECK CONTROL BOARD POWER STATUS LEDs -> REPLACE CONTROL BOARD -> RECALIBRATE PAPER FEED EXIT

Alarm	Description	Screen with Operator Instructions
9.4.8 Door Switch Failure	Occurs if door seal switch contact is made but door switch is still open.	STATUS . . ALARM! 237 DOOR SWITCH FAILURE CHAMBER: 00.0 F 0.0 psig STERILIZER WILL: • AUTOMATICALLY ABORT CYCLE • EXHAUST CHAMBER TO ATMOSPHERIC PRESSURE OPERATOR INSTRUCTIONS: 1. SILENCE ALARM 2. CALL SERVICE SILENCE ALARM STATUS PRINT PAPER FEED SERVICE HELP

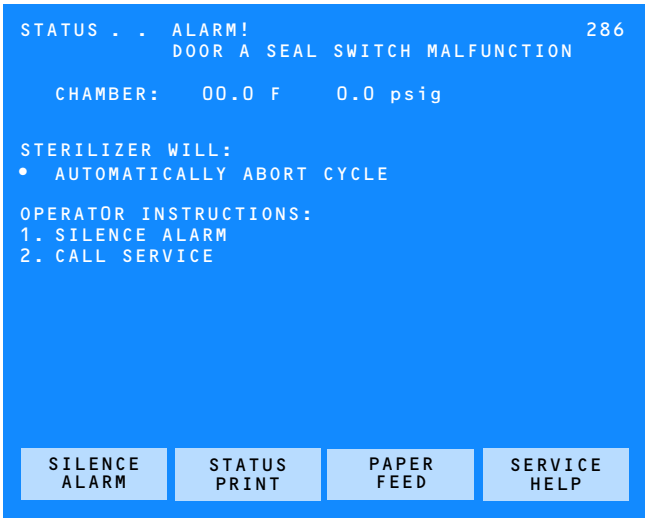
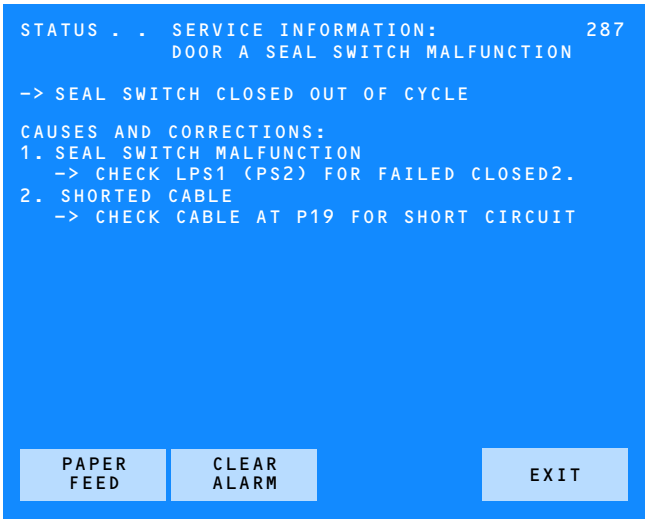
Screen with Service Instructions

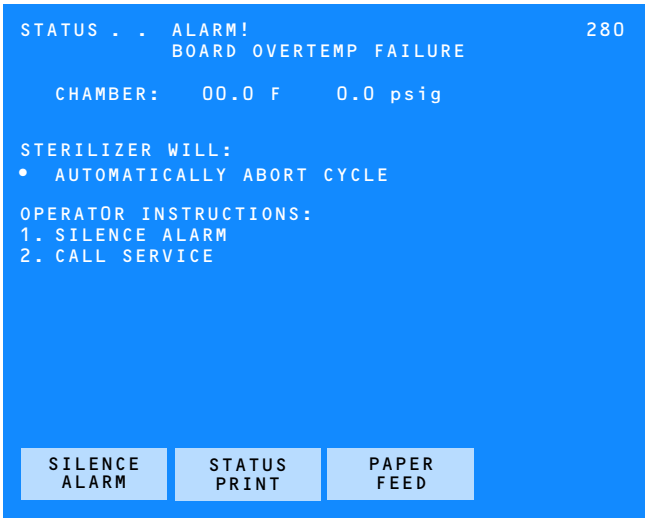
STATUS . . SERVICE INFORMATION: 238
DOOR SWITCH FAILURE

-> DOOR SWITCH OPEN WHILE SEAL SWITCH CLOSED

CAUSES AND CORRECTIONS:
1. DOOR SWITCH MALFUNCTION
-> CHECK LS1 (LS2) CONNECTIONS
-> READJUST LS1 (LS2)
-> REPAIR LS1 (LS2)
2. SEAL PRESSURE SWITCH MALFUNCTION
-> READJUST PS1 (PS2)
-> REPAIR LPS1 (PS2)

PAPER FEED EXIT

Alarm	Description	Screen with Operator Instructions
9.4.9 Door Seal A Switch Malfunction	Occurs if switched neutral relay, associated with door seal A, closed switch fails.	
		Screen with Service Instructions
		

Alarm	Description	Screen with Operator Instructions
9.4.10 Board Overtemp Failure	Occurs if the temperature of the main control circuit board exceeds acceptable environmental conditions.	

SERVICE PROCEDURES

10

WARNING – BURN HAZARD: Allow sterilizer and accessories to cool to room temperature before performing any cleaning or maintenance procedures.

WARNING – ELECTRIC SHOCK HAZARD: Disconnect all utilities to sterilizer before servicing. Do not service the sterilizer unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.

WARNING – PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE HAZARD: The performance of the 510k cleared AMSCO C Series Sterilizer is validated as a system including components defined by STERIS in the Operator Manual and Service Manual for the AMSCO C Series Sterilizer. Substitution of unauthorized components can potentially lead to personal injury, damage or premature failure of the product and result in a unit configuration that is inconsistent with the validated, FDA cleared product. STERIS' warranty is void if components are used that are not approved. DO NOT USE components that are not validated as part of the AMSCO C Series Sterilizer.

10.1 General

The material in this section is provided to allow for servicing components of the sterilizer most likely to need attention. These procedures are more advanced than cleaning and replacing expendables (such as printer paper and door seals). These procedures should always be performed by an experienced, trained service technician.

10.2 Air Filter Replacement

The purpose of the bacterial air filter is to filter air entering the sterilization chamber. The chamber is exposed to contamination whenever the filter or the air lines below the filter are opened. Keep these components as clean as possible when servicing. The bacterial air filter contains a replaceable filter cartridge; refer to **Table 8-1. Preventative Maintenance Schedule** for frequency.

1. Remove the old filter element and discard.
2. Insert the new filter, P129360-802.

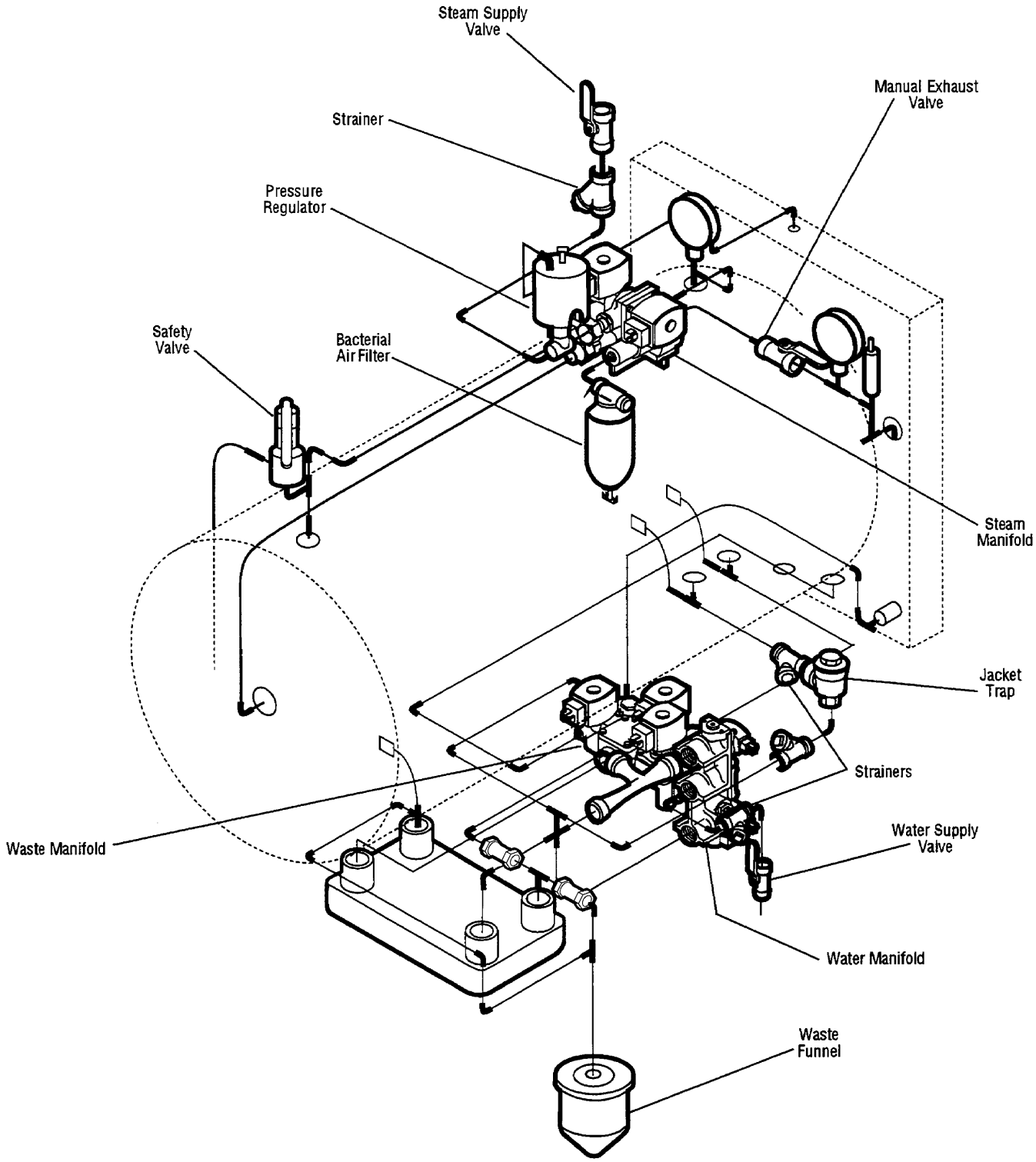


Figure 10-1. Serviceable Components

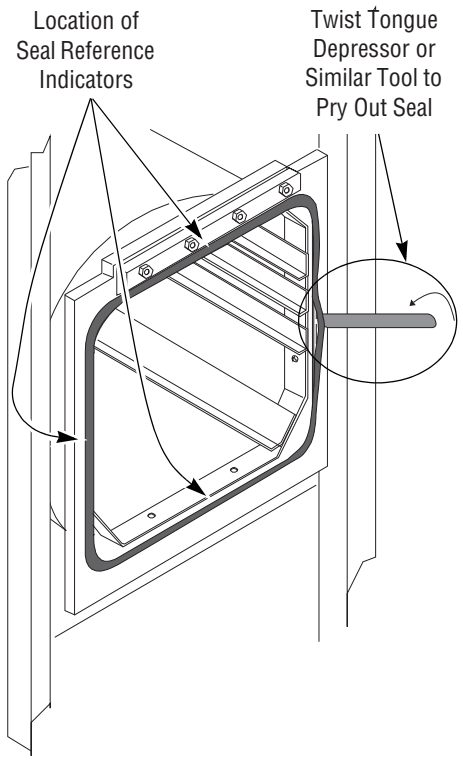


Figure 10-2. Remove Door Seal

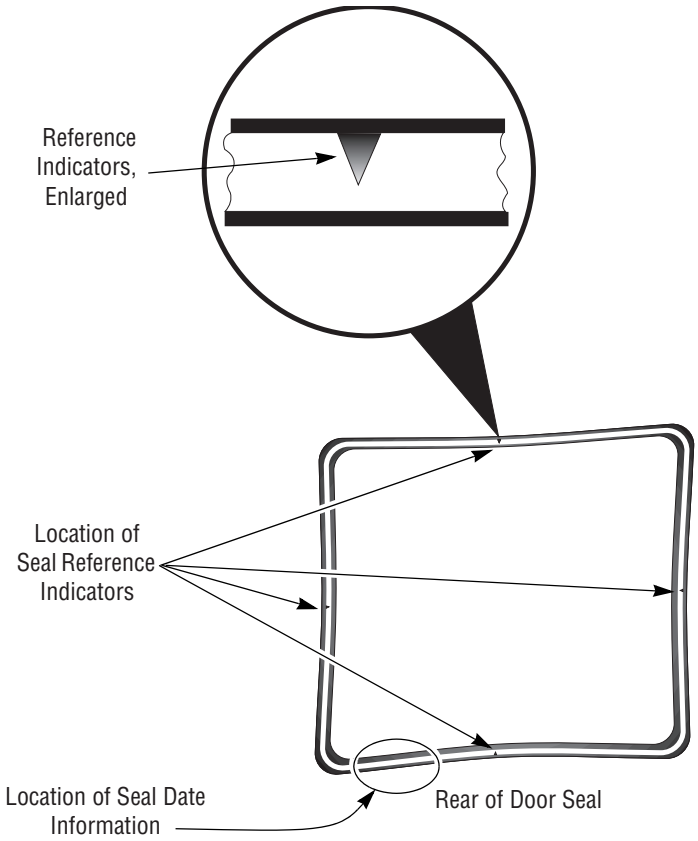


Figure 10-3. Location of Seal Lot Data and Reference indicators

10.3 Clean Strainers

The strainers should be opened for cleaning after initial start-up and at least twice a year thereafter (refer to **Table 8-1. Preventative Maintenance Schedule**). Accumulation of sediment and rust will reduce pressure and flow. In extreme conditions, complete blockage may occur.

WARNING – BURN HAZARD: Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.

Disassembly

Shut off supply and then vent pressure in line by running a short sterilizer cycle. Abort cycle when no pressure is present in steam or water lines.

1. Assure water and steam lines are still shut off.
2. Remove hex plug and gasket.
3. Pull out strainer screen from body.
4. Scrape and polish all rust and residue from strainer screen and body. Use a wire brush or steel wool. Be sure that all perforations are clear. Replace screen if damaged, rusted or corroded.

Reassembly

1. Insert screen into strainer body. Ensure that no dirt or other particles remain in strainer body.
2. Replace and tighten hex plug. Use a new gasket if necessary.
3. Make certain all pipe connections are tight after assembly.

10.4 Door Seal Replacement Procedure

WARNING – BURN HAZARD: Allow sterilizer and accessories to cool to room temperature before performing any cleaning or maintenance procedures.

Refer to Figures 10-2 and 10-3.

This procedure should be performed by a qualified service technician. If door seal requires replacement, perform the following:

1. Allow sterilizer chamber and end frame to cool to room temperature.
2. Open sterilizer door.
3. Use flat tool with rounded edges (such as a tongue depressor or non-serrated table knife) to pry and twist one section of the seal partially from the groove. Refer to Figure 10-2.
4. Grasp the raised section of the seal and pull the remainder from the end frame groove.
5. Examine the end frame groove for debris or residue. Clean if necessary.
6. Install new seal as follows:

NOTE: *Ensure that lot data molded into rear of seal (refer to Figure 10-3) is at the bottom of the groove.*

- **Do not** use a sharp instrument to install the seal.
- **Do not** stretch the seal.

a. Align right and left reference indicators with drill point reference marks in seal groove, align top and bottom indicators with the drill point reference marks in seal groove.

NOTE: *Reference indicators are located inside the rear groove of door seal, at the middle of each side (refer to Figure 10-4).*

b. Press seal in at each reference point with fingertips.

c. Press seal in at each corner with fingertips.

d. Press remainder of the seal into end frame groove.

7. Test installation.

a. Attempt to close the door. If the door sticks or will not fully close at any point in its travel, check to make sure the seal has been fully pressed into the groove.

b. Run a shortened test cycle to determine if the door seals adequately. If steam leaks from around the door or the seal, abort the cycle and examine the seal to ensure it has been properly seated in the end frame groove. Once re-seated, run another test cycle. If the door fails to seal following the second test, another problem may exist. Contact your supervisor before using the sterilizer further.

At the end of the cycle, ensure seal has retracted fully into the groove.

10.5 Steam Trap Replacement

WARNING – BURN HAZARD:

- **Allow sterilizer and accessories to cool to room temperature before performing any cleaning.**
- **Jacket pressure must be at 0 psig before beginning work on the steam trap.**

CAUTION – POSSIBLE EQUIPMENT DMAMGE HAZARD: Allow thermostatic traps to cool down to room temperature before removing cover. Since there is nothing to limit expansion, the bellows may rupture or fatigue if trap is opened while hot.

Refer to Figure 10-4.

Disassembly

1. Using a suitable wrench, unscrew and remove the cap and bellows assembly.
2. Remove seat from body using a hex socket wrench.
3. Wipe out bowl taking care that loose material does not enter the piping.

Reassembly

1. Screw new seat in firmly. (Use a socket head wrench to tighten.)

   NOTE: *Seat and bellows are a lapped pair.*
2. Install new bellows.
3. Replace cap and attached bellows assembly, using a new gasket.
4. Check for leaks.

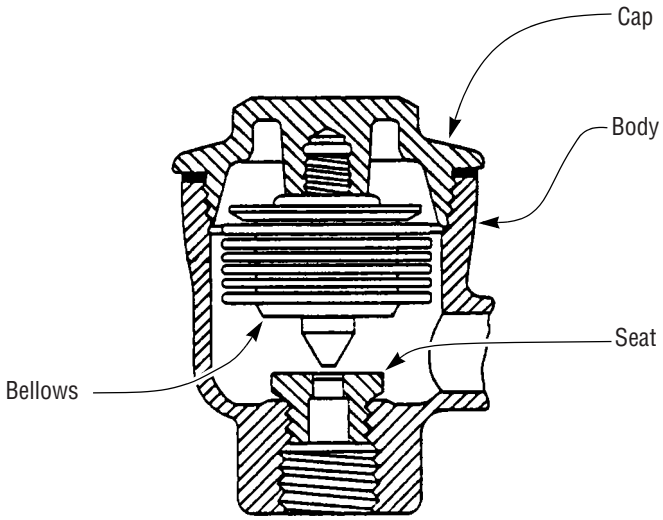


Figure 10-4. Steam Trap

10.6 Clean or Replace Piping Check Valves

Repair of check valve is limited to cleaning of valve seats when foreign matter causes improper operation. When a valve becomes defective, the entire valve must be replaced, unless the check valve has a field repair kit. Kit consists of new seals and springs. Please contact STERIS Corporation for correct check valve part number.

10.7 Rebuild Solenoid Valves

Refer to Figure 10-5.

Solenoid valves can be rebuilt following the instructions included in the repair kit for the specific valve. Refer to **Table 10-1. Replacement Parts,** for correct kit number.

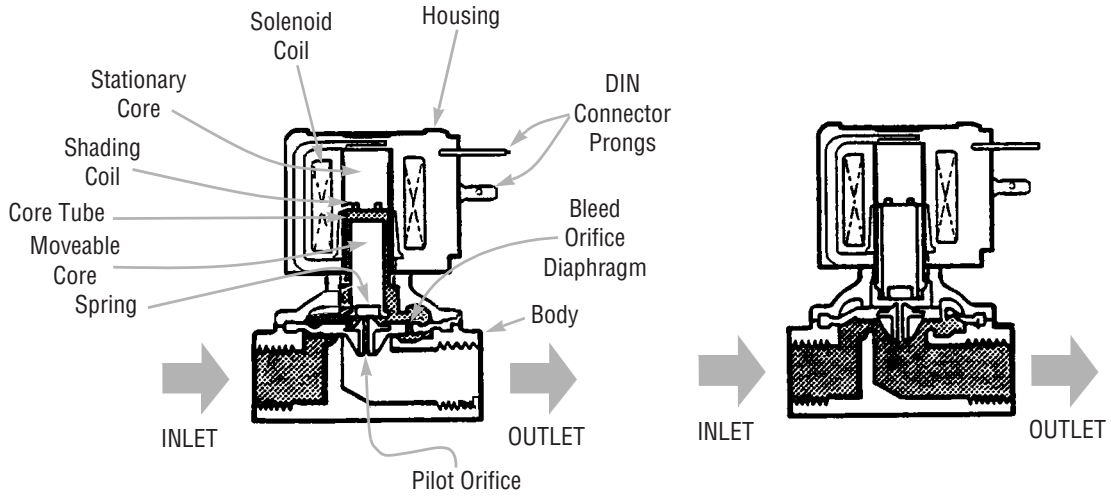


Figure 10-5. Internal Pilot-Operated Solenoid Valve.

10.8 Safety Valve Test

WARNING – BURN HAZARD: Proper testing of the safety valve requires the valve to be operated under pressure. Exhaust from the safety valve is hot and can cause burns. Proper safety attire (gloves, eye protection, insulated overall) as designated by OSHA, is required. Testing is to be performed by qualified service personnel only.

CAUTION – POSSIBLE EQUIPMENT DMAMGE HAZARD: Actuation at less than 75% of rated pressure can allow debris to contaminate the seat and cause the safety valve to leak. A leaking safety valve must be replaced.

The safety valves are to be tested periodically (refer to **Table 8-1. Preventive Maintenance Schedule** at the beginning of *SECTION 8, ROUTINE MAINTENANCE*).

1. Prevent damage during testing by ensuring that at least 75% of the rated pressure is in the chamber. Check current pressure level by observing chamber pressure gauge.
2. Open the try lever and hold the valve open for one to two seconds.
3. Allow the try lever to snap shut.

Any adjustments to the safety relief valve should be performed by a qualified service technician. Improper adjustments to this valve may result in inadequate sterilizer operation.

10.9 Recommended Spare Parts

To order replacement parts and/or supply products, proceed as follows:

1. Include the description and part/order number as listed in **Table 10-1. Replacement Parts**.
2. Include the model and serial numbers of your sterilizer on your order.
3. Send your order directly to the sales and service center serving your area.

Contact your sales representative for recommendations on cleaning products, biological indicators or parts that are not listed in **Table 10-1. Replacement Parts**.

NOTE: *Use only STERIS authorized parts on this equipment. Use of unauthorized parts will void the warranty.*

Table 10-1. Replacement Parts
AMSCO C Series Small Steam Sterilizer
16 x 16" (406 x 406 mm) and 20 x 20” (508 x 508 mm)

Schematic Designation	Part Number	Description
MTR1	P146660-338	DOOR MOTOR
CK14	P010278-091	SWING CHECK VALVE-1/4”
PS1, 2	P083865-001	SWITCH, PRESSURE
ST1	P047708-091	STRAINER, 3/4 NPT
M1	P093918-066	3/4 NPT UNION BALL
EJ1	P083924-001	1/2 NPT WATER EJECT
HX1	P146657-822	16" HEAT EXCHANGER
HX1	P146660-110	20” HEAT EXCHANGER
CK1, 2	P056402-066	CHECK VALVE, 1/2" NPT
W	P146660-109	FUNNEL & CAP ASSY
TR	P129222-001	STEAM TRAP, 1/2"NPT
CK3	P150822-354	SWING CHECK VALVE-1/2”
ST2, 3	P150828-459	STRAINER, 1/2" NPT-
RTD1, 3	P093911-351	RTD ASSEMBLY
RTD2	P093922-107	PROBE, TWO-WIRE RTD
ST4	P093918-035	STRAINER ASSEMBLY
LL1	P093918-038	SWITCH FLOAT
	P093918-212	1/4 NPT BALL VALVE
RV1	P093918-511	SAFETY VALVE PED/AS
PT	P136809-787	TRANSDUCER, PRESSURE
F1	P093909-592	AIR FILTER ASM-1/2"
	P093918-065	1/2 NPT UNION BALL
PR1	P136809-750	VALVE ASSY, CONTROL
	P146676-039	STM. INLET MANIFOLD
	P146657-789	MANIFOLD – WATER
	P146657-788	MANIFOLD – EXHAUST
AMSCO C Series Printer Supplies		
	P093914-204	Printer Paper Roll (Pkg of 3)
	P150828-440	Printer Ribbon

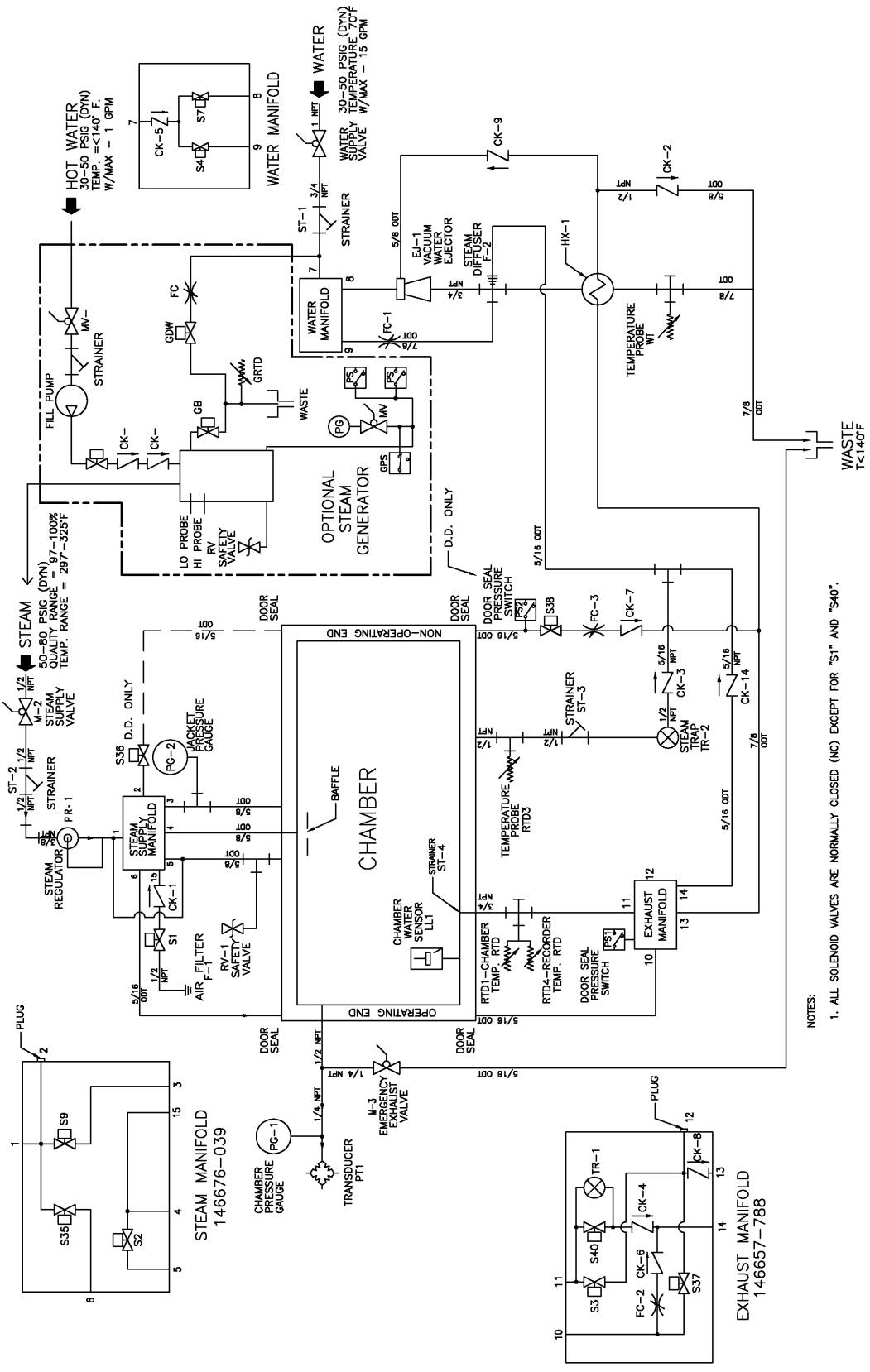


Figure 10-1. Piping Schematic

10.10 Waste Products Disposal

The following are waste materials associated with the sterilizer. When disposing of waste materials, be compliant with federal, state and local regulations.

- Printer paper – recyclable.
- Printer ribbon – not recyclable.
- Water filters – not recyclable.
- Waste water – 57 L/min (15 gal/min).
- Entire sterilizer (end-of-life) – Contact STERIS Corporation for disposal or recycling recommendations.